

Aspects of information literacy among Norwegian EFL students in upper secondary school

*A content analysis of student browser log
files and written texts*

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Abstract

In the present study, I have examined how EFL students in upper secondary school conduct their online research and implement source information into their written texts. My methodological approach is qualitative in the form of content analysis, and I have collected browser log files and written texts from four students, following three full-day English lessons during a period of approximately two months.

There have not been done any studies in the field of didactics that make use of browser history files as data. Moreover, there have been done very few studies on the topic of information literacy among students in upper secondary school. For that reason, this study fills a gap in research, and the goal of the project is to gain a deeper insight into the phenomenon of information literacy among EFL students. As a theoretical framework for the study, I have used the theory of mediated action by Jim Wertsch, and I have also applied three models of information credibility assessment strategies in order to analyze the collected data.

My findings indicate that there is some variation in the level of information literacy among my four participants. One of them displays a higher level of information literacy than the three others as indicated by sources of high credibility. However, the findings also reveal that all of the students visit many relevant websites which they do not make use of as sources in their written texts. In addition, the students also visit many websites that are not relevant for the topic of the written assignment. Moreover, none of the students refer to sources in their written work, which points to a lower level of information literacy. Lastly, in the discussion I argue that information literacy should be given a greater place within the subject of English, and that information literacy should be an integrated part of teaching and assessment in English.

I denne oppgaven har jeg undersøkt hvordan elever på videregående trinn gjør informasjonssøk på internet og hvordan de bruker kilder i sine skriftlige tekster. Jeg har brukt en kvalitativ metode der jeg har samlet inn nettleserloggfiler og skriftlige tekster fra fire elever.

Det er ikke tidligere blitt gjort studier innenfor fagdidaktikk der datagraunlaget består av nettleserloggfiler. Videre er det blitt gjort svært få studier på temaet informasjonskompetanse, eller «information literacy», blant elever i videregående skole. Min studie fyller et tomrom i forskningen og målet med prosjektet er å få økt innsikt i fenomenet informasjonskompetanse blant elever som har engelsk som fremmedspråk. Som teoretisk rammeverk for denne studien har jeg benyttet meg av teorien om mediert handling av Jim Wertsch, og tre ulike modeller for evaluering av kildekredibilitet.

Funnene peker på at det er en viss variasjon i informasjonskompetanse blant deltakerne i studien. Når man ser på kildebruk blant deltakerne viser en av dem et høyere nivå av informasjonskompetanse enn de tre andre deltakerne. Studien viser også at alle elevene besøker flere nettsider som de ikke gjør bruk av som kilder. Videre viser funnene at elevene besøker flere nettsider der innholdet ikke er relevant for den skriftlige oppgaven de jobber med. I tillegg viser dataene at ingen av elevene refererer til kilder i sine skriftlige tekster, noe som tyder på et lavere nivå av informasjonskompetanse. I diskusjonen peker jeg på at informasjonskompetanse burde få en større plass innenfor engelskfaget og at særlig begrepet «information literacy» bør få en plass i læreplanen for engelsk. Til sist peker jeg på informasjonskompetanse burde være en integrert del av undervisning og vurdering i engelsk.

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1 Introduction

Information literacy is a survival skill in the Information Age. Instead of drowning in the abundance of information that floods their lives, information literate people know how to find, evaluate, and use information effectively to solve a particular problem or make a decision---whether the information they select comes from a computer, a book, a government agency, a film, or any number of other possible resources. (Presidential Committee on Information Literacy, 1989)

It is a feature of our modern life that we have come to depend on the internet as a main source of information about any possible subject. Students in both primary and secondary school use computers during school time, and upper secondary students in Norway today have their own laptops in class. Computers are an essential tool in Norwegian classrooms, and class time is to a varying degree spent online. One of the goals of the school system is to prepare the students for adult life, and the students need to be taught how to master and take part in the digital universe effectively, to the greatest possible benefit for the individual and the community. The internet is a vast repository of information and learning resources, and students are skilled users of digital tools, who eagerly make use of new online tools.

Norwegian pupils spend a great amount of school time on the internet reading, watching and listening to information, both in order to gain new knowledge about different subjects and as a basis for written and oral work. In order to do this effectively, students rely on digital literacy. Digital literacy is a central part of the National Curriculum, and digital competency is listed as one of the basic skills in the National Curriculum for Knowledge Promotion, K06. In addition, digital competency is listed among the competency aims for the English subject in upper

secondary school (Kunnskapsdepartementet, 2013b). In fact, it is specifically stated, in the list of basic skills in the National Curriculum for English that, *"In many contexts, English-language skills are a prerequisite for being able to exploit new tools for extracting information for use in specialist contexts"*. Moreover, the National Curriculum for English for upper secondary school specifically states that students should be able to *"evaluate different sources and use contents from sources in an independent, critical and verifiable manner"*. And further, the students are also to produce texts as it is listed as a competency aim in K06: *"produce different kinds of texts suited to formal digital requirements for different digital media"* (Kunnskapsdepartementet, 2013b)

The aim for students in upper secondary school is to make use of their computers both for finding information online and for creating different kinds of texts. In this regard, it is quite useful to look at the issue of online research and information source use from an English didactics perspective. So far, there have not been conducted any studies in the field of didactics where browser history files have been used as data. Moreover, there has been done very little research on the topic of how students conduct research online. With this thesis, I aim to fill both a methodological and empirical gap in research, as I am using browser log files as data in my study about how upper secondary students do online research and make use of digital sources in their texts.

1.1.1 Digital literacy and English language competency

In many lessons across most subjects, students use the internet as a tool for accessing information. Regarding those instances where they make use of this tool in order to find information sources, students will to a varying degree depend upon English. As the recent study by Marte Blikstad-Balas indicated, Norwegian upper secondary students rely on the English version of Wikipedia to an equally large extent as the Norwegian

edition (Blikstad-Balas & Hvistendahl, 2013, p. 38). Students depend upon finding relevant information sources across subjects. Assuming that students perform tasks related to information research on a regular basis in most school subjects, it is clear that students are exposed to the English language in a large number of their lessons at school. Thus, English language competency is a key component of a highly frequent class activity. As an overwhelmingly large amount of the information online is in English, compared to the amount of information in Norwegian, it is reasonable to say that English language competency is a requirement for exercising digital literacy and information literacy in a globalized world.

1.1.2 Digital literacy and youth

Young people today have access to amounts of information greater than ever before and at the same time are faced with challenges in assessing the credibility of this information to a greater extent than before. As printed information in the form of textbooks was granted saliency through the authority of authors and publishers in earlier days, the information online must be assessed in terms of credibility, which in the form of the digital landscape has become increasingly complex. Young people born approximately after 1980 are in a particular position in relation to source assessment as they have lived their entire lives immersed in digital technology. (Flanagin & Metzger, 2007: 6)

One vital element of making use of internet resources is the ability to evaluate their trustworthiness, which is to be able to assess how credible a piece of information is. This specialized feature of digital literacy, which entails the selection, assessment and usage of information, is termed information literacy (David Buckingham, c2008). Young people have particular challenges regarding information literacy. They have been immersed in digital technology all their lives and have access to a constantly increasing amount of information. Compared to information in analogue formats, online info is more challenging to assess, as there are more factors to consider when evaluating the credibility of sources online.

Due to their immaturity and lack of experience, young people have a disadvantage compared to adults, even though adults also face challenges regarding information credibility assessment. It is important that the school assumes responsibility for teaching young people to become alert and responsible online citizens who are able to use the magnificent amount of digital information to their advantage.

Norwegian pupils spend a great amount of school time on the internet reading, watching and listening to information, both in order to gain new knowledge about different subjects and as a basis for written and oral work. Students should ideally increase their level of information literacy during these activities. Regarding online information literacy, the English language holds a unique position as it is in many cases a prerequisite for being able to access and evaluate online sources. Online research is an activity where students, regardless of school subject, will to a greater or lesser extent rely on English competency.

1.1.3 English in Norwegian upper secondary school

The Norwegian upper secondary school consists of three years: First year (VG1), second year (VG2) and third year (VG3). After having completed lower secondary school, Norwegian students are offered two main options; the general studies program and the vocational education program. The general studies program qualifies the students for further studies at university or college. The vocational education program offers the students to choose between nine vocational education programs, where the VG1 and Vg2 consists of school-based training which is followed by two years of enterprise-based training. Alternatively, students in the vocational education program who wish to continue on to higher education may complete a VG3 year of supplementary studies qualifying for higher education.

English is a common core subject on VG1 general studies, termed English foundation course. The students have 5 hours of English per week, totaling 140 teaching hours a year. On the vocational studies program, the foundational English course is taken over two years, across Vg1 and Vg2, with 3 hours of English per week during VG1 and 2 hours of English per week during Vg2, in sum 140 hours during VG1 + VG2. The students in the general studies program have the option of specializing during Vg2 and Vg3, where they can choose between the following: Program for Natural Science and Mathematics Studies, Program for Languages, Social Sciences and Economics Studies, Program for Sports and Physical Education, Program for Music, Dance and Drama and Program for Art, Craft and Design Studies. The Program for Languages, Social Sciences and Economics Studies enables the students to choose to specialize in English. Specialization in English comprises three subjects: International English (Vg2) and the two VG3 subject alternatives social studies English and English literature and culture.

1.1.4 General studies as preparation for higher education

Young people go to school with the intention of being prepared for adult life and thus become wholesome citizens of the community. The Norwegian upper secondary school offers both vocational studies and general studies. The aim of general studies is to prepare upper secondary students for further education and academia. Academic life is demanding for many students coming from school and requires in most cases that students enhance their scholastic efforts. They will depend upon some of the skills they have learnt during secondary school to an even greater extent when entering academia. Examples of these skills are the basic competencies such as reading, writing, listening and speaking in addition to digital competency. Moreover, as portions of the curriculum, depending on the field of study, are in many cases in English, the students need solid English language skills in order to succeed with higher education.

To some extent, it seems like upper secondary school does not sufficiently prepare students for higher education. A study conducted by Glenn Ole Hellekjær regarding the vocabulary level of students in upper secondary point out that the youths do not learn adequate English skills to support them through higher education (Hellekjaer, 2009). Many students struggle with a curriculum in English. Norwegian is a small language in the world, and as translation services cost money, students at university and college cannot, depending on the field of study, expect to find the entire curriculum in Norwegian. In addition to language competency, a key component of academia is the use of information sources and how to handle these correctly. To a great extent, information literacy is a key component of academic skills. Digital skills and source use are listed as basic competencies in K06, meaning that these skills should be taught across all subjects.

1.1.5 Personal motive for master

During my practice period as part of the PPU at the University of Oslo, I taught two upper secondary VG2 classes in the subject International English. During my practice period, the classes completed two graded oral assignments, where they were to give a presentation to the class. The students were given three weeks to prepare for their presentations. It was my impression after having observed and guided the students through their research process that it is challenging for many students to manage their time during periods of research. Quite a few students did to some extent struggle, both to find relevant sources, but also to stay focused on the task at hand while they were looking for sources online. These observations inspired me wanting to further examine the topic of online research among students. In addition, this experience helped me decide upon a choice of method and data from quite early on, as I saw how effective browser log files are in giving an overview of browser history during a given period of time.

1.1.6 Pilot study

During the first semester of my master course, I conducted a qualitative study on the teaching and assessment of the use of digital sources (Falkenberg, 2010). The study contained interviews with two upper secondary school teachers, where the questions centered on how source use was taught in class and to what extent the teacher assessed source use in student texts. The study revealed that little time is spent on teaching students how to use sources, and teachers do not have time to assess how the students use sources in their written texts. These findings inspired me to examine the topic of research and source use among upper secondary students.

1.1.7 Reviews

There have not been conducted many studies in Norway about online research and the assessment of source use among students in secondary school. It has been a challenge to find studies relevant for my project; however, for my review selection I have chosen three studies that have some aspects in common with my study. This section contains a short presentation of the reviews, which I will explain in more detail in chapter 2. Firstly, a recent two-part study regarding digital literacy in upper secondary school has been conducted here in Norway. The first part of the study is by Marte Blikstad-Balas and contains a qualitative approach where the researchers use head-mounted cameras in order to examine how students in upper secondary school use their laptops during plenary teaching. The video footage is used in semi-structured interviews with the participants (Blikstad-Balas, 2012). The second part of this study has been conducted by M. Blikstad-Balas and R. Hvistendahl. It is a quantitative study containing a large survey of secondary students and teachers regarding the use of Wikipedia (Blikstad-Balas & Hvistendahl, 2013).

The second review I have selected is a case study conducted by I. C. Chou regarding the on-screen reading behaviors of graduate students with English as their second language (Chou, 2012). This study is somewhat relevant for my project, as the participants are non-native English speakers, and they are interviewed about their reading behavior when reading screen-based and paper-based texts. The third review I have selected is a large quantitative study from Trentino, Italy, where secondary students have completed a survey with the aim of uncovering their level of digital literacy and information literacy (Gui & Argentin, 2011). This study is relevant for my project, as the participants are in the same age group as my participants and the computer access of the students in the Italian study is similar to that of students in Norway.

1.1.8 Theoretical framework

As a theoretical framework for my research, I have chosen the theory of “mediated action”, as developed by Jim Wertsch. The concept is from the field of sociology and pertains to how agents use cultural tools in mediated action. In view of my study, the cultural tool is the online computer, whereas the agent is the student in secondary school. The mediated action is the research process the students are involved in by the use of their computers. Related to mediated action are also the concepts of “mastery” and “appropriation” which point to the level of skills and competency the students possess. In light of my study, the concept of “mastery” can be viewed as digital or computer literacy, whereas “appropriation” is what can be termed information literacy. Further, the process of mediated action is marked by what Wertsch calls “constraints and affordances”, which indicate the advantages and disadvantages the students experience as part of their online research process (Wertsch, 1998). For this study, I make use of the theory of mediated action in order to illuminate certain features and tendencies of the research material.

When analysing data from the log files and source lists, I have made use of concepts regarding source credibility assessment. I have looked at broad tendencies regarding credibility assessment strategies and have made use of the following frameworks for source credibility assessment strategies; the contextual approach as formulated by Marc Meola (Meola, 2004) and the approach concerning information credibility in the age of online social networks and collaboration as formulated by Flanigan and Metzger (Metzger, 2007). I have made use of these two models in order to assess level of credibility of the websites from the log files and the written assignments of my participants.

1.1.9 Research statement

Students in upper secondary school now have their own laptops, and the aim is to make use of these computers as learning tools across subjects. Students and teachers have come to rely on online laptops in order to maximize their learning in a digital age. The online computer has many purposes for students; one of them is to access online sources and make use of these in text production. This is a frequent and time-consuming process in Norwegian classrooms. However, there have not been conducted many studies in Norway regarding this topic. My project is a qualitative study, where the aim is to gain insight into the topic of online research among upper secondary school students, and how they possibly make use of digital sources in order to write texts in English. My research statement is:

Aspects of information literacy among Norwegian EFL students in upper secondary school:

- *How do upper secondary school students do research online?*
- *How do they make use of sources in their written work?*

In order to try to answer these questions, I have used a qualitative method of content analysis, which entails gathering data in the form of browser log files and written student texts.

1.1.10 Thesis Outline

My thesis consists of eight chapters. Chapter 1 contains the introduction where I situate my project within the field of English didactics and present the research statement. In chapter 2, I present grounds for choice of topic and give an overview of research that I have found relevant in different regards for my study. In chapter 3, I present the theories that have guided my research. This chapter contains an outline of the theory of mediated action by Jim Wertsch, which I have used as a theoretical framework for my research. Chapter 4 contains a presentation of three main models of information credibility assessment strategies. These models have been used for analysing the data in chapter 6.

Chapter 5 is where I present my choice of method. The chapter comprises sections about data sample, validity, reliability, ethical considerations, and an explanation for my choice of method. Chapter 6 gives an overview of the data collected in this study and subsequent findings derived from these data. In chapter 7, these findings are discussed in light of the theory of mediated action in an attempt to answer the research question. The chapter concludes with an outline of the consequences my results might have for English didactics and the teaching of information literacy, and how the results might point to areas of further research. The final chapter contains a summary of the main points of the thesis

2 Motive and Reviews

2.1 Description of phenomenon

I am writing about the act of searching the internet for information, as performed by students in upper secondary school with the aim of using the information in a written text later. The participants in my study are given fairly broad written assignments that they are to publish on the internet upon completion. They not only search online to find suitable information which they can implement in their own texts, but they in turn contribute to the vast repository of online info on a given topic, through their own publishing. In such a way, they are influenced by what they find, and thus publish the info in a new form and in a new context in order for other people to be influenced by what they publish. The students become part of an "information ecosystem".

The exact process whereby the students search for information during the course of their VG2 International English classes each Tuesday is evidenced by the log files from their browser. What I am writing about is not solely about how students locate information on the Internet, as the log files reveal more than just that. The log files explain the scenario that happens when the students log on and let certain search words and phrases lead them in the search for information they find useful in the context of a written assignment. However, there are multiple possibilities of distraction online. Exactly how do the students spend their time online during English class? What kind of websites do they visit, which search words do they type into the Google search box, and how might some of the material they find be implemented in their texts?

The log files from their computers might indicate how effectively their class time is spent, and they might also give an indication of the level of digital literacy the students possess. Data indicate that students in upper secondary school spend varying amounts of class time online. Also, most schools now either equip the students with laptops, or encourage them to bring their own personal laptops, which they are to use as a learning tool at school. In view of this, it is relevant to look at how the students make use of their online laptops during class time and to what extent their online search habits might reveal level of certain forms of digital competency. Particularly when looking at the English subject, it is clear that English competency to a greater or lesser extent in many cases is a prerequisite for being able to develop one primary aspect of digital literacy, namely information literacy.

2.2 Grounds for choice of topic

K06 and PISA

As stated in the National Curriculum for Knowledge Promotion, K06, students depend upon English language skills in order to locate and make use of information on the Internet. LK06 particularly acknowledges the mastery of digital tools as a basic skill, and lists this as the fifth basic skill following reading, writing, speaking and arithmetical skills. Digital skills are required in order to extract information for use in various contexts, whereby source criticism, copyright and personal protection are listed as key concerns (Kunnskapsdepartementet, 2013a) This fifth basic skill can be regarded as equivalent to digital literacy, which entails the mastery of digital tools in addition to information literacy.

Digital literacy is mentioned several times in K06 about digital skills as a basic competency in English - points about sources have been emphasized with large font:

Digital skills in English means being able to use a varied selection of digital tools, media and resources to assist in language learning, to communicate in English and to acquire relevant knowledge in the subject of English. The use of digital resources provides opportunities to experience English texts in authentic situations, meaning natural and unadapted situations. ***The development of digital skills involves gathering and processing information to create different kinds of text.*** Formal requirements in digital texts means that effects, images, tables, headlines and bullet points are compiled to emphasise and communicate a message. ***This further involves using digital sources in written texts and oral communication and having a critical and independent attitude to the use of sources. Digital skills involve developing knowledge about copyright and protection of personal privacy through verifiable references to sources*** (Kunnskapsdepartementet, 2013a).

Further, source use is also listed as a concrete competency aim in English for VG1 general studies program and VG2 vocational program: **“evaluate different digital resources and other aids critically and independently, and use them in own language learning”** (Kunnskapsdepartementet, 2013b)

Regarding the current state of digital literacy in Norwegian lower and upper secondary schools, the National Network for IT-Research and Competence in Education (ITU) conducted a study in 2009. The aim of the study was to examine to what extent schools had emphasized the fifth basic skill of LK06, by conducting surveys involving students, teachers and school leaders in addition to a test in digital literacy for both students and teachers (Berge, Hatlevik, Kløvstad, Ottestad, & Skaug, 2009) The study revealed that there were large variations between individuals and institutions, which could be attributed to a lack of resource allocation and a lack of overall strategic plans for the implementation of ICT as a didactic tool in schools.

Another large survey concerned with students' digital literacy was conducted internationally by the Program for International Student Assessment, PISA, in the spring of 2009. This was its fourth main international survey, and as an expansion to the main area of testing students' reading skills, the ability to read digital texts was added. As part of this test, the test group consisting of students from 10th grade, were asked to read and navigate between various types of digital texts. The students were to write answers to 29 questions based on 8 digital texts in sum. The survey indicated that Norwegian students scored on average with students in other OECD countries, and Norway also had the most narrowly distributed score of all the participating countries. However, Norwegian students appeared to score below average on texts containing large amounts of information and texts written in a formal, academic tone.

The PISA survey also revealed that 98% of Norwegian students have a computer connected to the internet at home, and the distribution of school computers are 0,85 computers to every student. It also seems that the level of day-to-day online activities has very little impact on digital reading test scores in Norway. The study indicated that higher levels of digital reading skills could be related to the extent to which students use internet to find information as a leisurely activity. Computer use at home amongst Norwegian students seems to be centered around entertainment purposes, such as downloading music, games and online social networking, and to a lesser extent information seeking with the aim of gaining knowledge (Frønes, Narvhus, & Jetne, 2009)

Personal motive for master thesis.

During my practice period at an upper secondary school, I observed the research process of two English classes, as they prepared for an oral presentation. The research process and preparatory period lasted for around three weeks. During this period, the students worked independently, mostly on their laptops, where they gathered information

and constructed their oral presentations. I was struck by how little insight a teacher has into how exactly the students conduct their online research. Even though the teacher does check on the students and offers help and assessment during the research period, the teacher still only observes various snapshots of his/her students' research processes. I became curious about the collected number of websites the students visit and how they select which sources to use. Additionally, I also observed how some students opted for breaks during research, where they logged into seemingly unrelated online material such as online network sites and games.

However, the challenges of doing research online apply not only to students in upper secondary, but of course, to most individuals who have come to depend on the internet as their source of more or less vital information. The topic of online research and information assessment concerns every person who uses a computer connected to the internet. Young people are particularly vulnerable due to their possible lack of experience and knowledge. Also, the field of digital technology in schools needs more research, as large amounts of money and valuable class time goes into the use of digital technology as a tool for teaching and learning.

When we encourage the students to find and make use of online sources, the focus is no longer solely on the finished product, but also on the process itself. For teachers in the digital age, it is not just a matter of assessing the finished oral or written text, but the teacher must also look at how the students have used their digital tools in order to reach their learning goals. The research processes of students are mostly hidden from teachers, except from the instances when teachers look at the PC screens of students during class. The aim of my study is to take a detailed look at this largely hidden process, which is mostly governed by the students.

Pilot Study as Part of Master Course

As part of my master in English didactics, one of the Master's level courses "EDID4030 Fundamental concepts of teaching English as a foreign language" entailed doing a small-scale study on a topic within the field of English didactics. I chose the topic of digital competency in relation to how teachers teach and assess the use of sources in written student texts. As part of the research for the study, I interviewed three teachers about how they teach information literacy and to what extent they assess the source use of their students. The results from this qualitative study indicated that information literacy is to a great extent taught by either the librarian at the school or the teacher. Class time allocated to the teaching of information research and source use is limited to one double-lesson. Furthermore, the participants in the study admitted that due to time constraints, they were not able to assess the use of sources in the written texts of their students (Falkenberg, 2010).

2.3 Reviews

Multiple studies on various elements of digital literacy have been conducted in recent years. As a basis for starting my work on this master thesis, it was necessary to read through a large number of academic articles related to the topic of digital literacy, and particularly information literacy among students in upper secondary school. There have been conducted rather few studies concerning the online information research processes of students in upper secondary school. Moreover, I have not found any studies on this topic where browser log files have been used as data. Therefore, to my knowledge, there are no studies that are comparable to mine, as the topic of research is rather rare, and my choice of data is unique. I have selected reviews that share some similarities with my study, but there are some marked differences as well.

I chose three studies, where one is from Norway and the two others are from the USA and Italy respectively. The Norwegian study uses a mixed methods approach to shed some light on how students in secondary school use their laptops during teaching. The second study is a large quantitative study from Italy involving one thousand high school students from a middle-class area; the aim of the study was to uncover some knowledge about the level of information and digital literacy amongst the students. The third study is a qualitative study involving six university graduate students, where the students, as non-native speakers of English, were interviewed about their on-screen reading behavior. My research project shares some common features with the three studies mentioned above, and they to some extent illuminate a few aspects regarding both the participants and research aims of my study.

A recent study conducted by Marthe Blikstad-Balas at the University of Oslo explores how a selection of students in upper secondary school make use of their laptops during class across different subjects (Blikstad-Balas, 2012). The study was based on a mixed methods approach using footage from video cameras which were mounted on the heads of the participants, in addition to subsequent semi-structured interviews with the students. The video footage was captured during two of the most common school contexts; plenary teaching and while students worked on tasks. The participants in the study were students in their third year of upper secondary school.

The study involved four students during 18 lessons in the following three subjects: religion and ethics, Norwegian language arts and history. The collected video data amounted to 64 recordings of 18 lessons in total. The researcher also collected textual artefacts from the video recordings, such as textbooks, handouts and student notes, to use as material for the semi-structured interviews. In addition to these textual artefacts, still photos, which showed literacy activities that were representative of what

the students were engaging with during a given time in a lesson, were also used during the semi-structured interviews. One research aim of the interviews was to let the students elaborate on the activities they spent the most time on during a lesson.

The results from the video clips clearly show that the students engage in what Blikstad-Balas coins “vernacular activities” on their computers during teacher presentations. Vernacular activities in this context meaning online content, such as games, newspapers, blogs etc. that is not related to the topic material that the teacher is presenting in class. The students have no limitations on how they use their computers during teacher presentations in class. The teachers publish materials from their presentations on the LMS, and students experience that they do not have to pay attention while the teacher presents the material. In addition, the students are under the impression that the computer related activities they engage in at school are not so different from activities at home. As Blikstad-Balas states, “...Indeed, an overwhelming majority of the texts the students choose to spend time on during teacher presentations are not what could be categorized as dominant or integrated in the school domain in any way. On the contrary, these texts have entertainment as the main goal” (Blikstad-Balas, 2012, p. 90).

It appears that the students resort to entertaining online activities that they are used to from home, in spite of that they know that they should pay attention and take notes during the teacher’s presentation. Some important reasons for this are that there are no immediate consequences for being preoccupied with vernacular activities during class, and also that there are no restrictions on the use of the internet during plenary teaching. When comparing such an educational setting with the class setting in my study, there is one important difference, namely that the students in my study get to work independently on their texts in class. In addition, they are almost required to spend time online, as their texts are to be published on a blog platform, and they are encouraged to

make use of sources in their written work. When looking at the results from the study of Blikstad-Balas, it is to be expected that the students in my study spend some of their online time on online texts forms of entertainment that are not related to the topic of their written assignments.

In addition to the study mentioned above, Marte Blikstad-Balas and Rita Hvistendahl did a connected study on how upper secondary students relate to the online encyclopedia Wikipedia. The study consisted of in-depth qualitative interviews with the four students from the study mentioned above, in addition to a quantitative study with a survey involving 168 participants from eight different schools in Akershus and Oslo (Blikstad-Balas & Hvistendahl, 2013, p. 37). The in-depth interviews with the four students were related to their activities while working on tasks in Norwegian language arts class. The participants in the quantitative survey were students in their last year of upper secondary school, from a variety of areas and socio-economic backgrounds. The survey consisted of 30 multiple-choice questions and two open ended questions where the participants were to write individual comments.

The result of the survey indicate that students generally are quite positive to Wikipedia as an information source. All of the respondents had visited the Norwegian version, whereas 99 % of the respondents had visited the English version. An equal percentage of respondents agreed with the claim "I find it easy to find information on Wikipedia", but at the same time, 96 % of participants agreed with the claim "The information on Wikipedia might be wrong". Similarly, 89 % disagreed with the claim "Wikipedia is as trustworthy as their textbooks" while 83 % still agreed with the claim "I enjoy using Wikipedia for school purposes". In sum, the students are aware of the possible credibility issues regarding the information on Wikipedia and most of them believe their textbooks to be more trustworthy (Blikstad-Balas & Hvistendahl, 2013, p. 38).

However, due to the user-friendliness of Wikipedia as a fast and easy source of information, the students enjoy and use the online encyclopedia to a great extent, albeit the information might not be reliable (Blikstad-Balas & Hvistendahl, 2013, p. 38). The issue of credibility is also evidenced by how the answers vary regarding how Norwegian language arts teachers view Wikipedia as a source of information. According to the survey, the same teachers receive different scores on this question, which indicates that the students are not always sure about whether their teacher approves of Wikipedia. Also, the open-ended questions on the survey reveal that quite a few respondents list the teacher's negative attitude towards Wikipedia as one of the disadvantages of using it (Blikstad-Balas & Hvistendahl, 2013).

The findings were somewhat similar in the contextual in-depth interviews in the study. Also, in this case the students make use of Wikipedia in finding information, and it is often among the top hits when the students use the Google search engine in finding sources. In contrast, the Norwegian language arts teacher does not mention Wikipedia in class, but rather recommends that the students use the textbook as an information source. The students however, find the book to be boring and not very user-friendly, as it contains large amounts of unnecessary information (Blikstad-Balas & Hvistendahl, 2013, p. 40). To a large extent, the interviewees use Wikipedia when completing smaller, ungraded tasks which do not require a deeper level of reflection, but rather require that the students present information. For these types of tasks, which were the most frequent kinds of tasks given in Norwegian language arts, the students would even copy information from Wikipedia, without much credibility assessment. Oppositely, the students reported that Wikipedia and copy & paste was not suitable for graded assignments, as these assignments require a deeper understanding, while there are strict rules regarding plagiarism (Blikstad-Balas & Hvistendahl, 2013).

The findings from the study about Wikipedia use among students are relevant for my study as well. My participants are upper secondary students who are asked to do research for written graded assignments. According to the findings from Blikstad-Balas, I should expect to find that the students perhaps use Wikipedia for quick references. Similarly, the students in my study might avoid adding Wikipedia to their list of sources, but rather opt for sources that are of higher credibility and possibly even approved by their teacher. The students in my study are to write texts that require that they discuss a topic and to some extent present their own opinions. In this regard, it would be interesting to see how the data from my research relate to the findings in the study by Blikstad-Balas and Hvistendahl.

Another project done by I-Chia Chou at the University of Michigan examined the on-screen reading behavior of university level graduate students with English as their second language. The study involved a qualitative approach entailing both interviews and observation of the screen-based reading behavior of six students. Firstly, the open-ended semi-structured interviews concerned the students own evaluations and decisions about their reading of screen-based academic texts. The subsequent observational sessions were done in order to elicit the actual reading behavior of the interviewees. Both the interviews and the observations divided reading behavior according to the two main purposes: reading to prepare for courses and reading to write academic papers. The study revealed that the students on average displayed less willingness to read on-screen when preparing for courses, and that the screen-based reading was largely reserved for material that did not require extensive note-taking (Chou, 2012).

The students also applied reading strategies to a greater extent when reading on-screen with the aim of writing papers, rather than when preparing for courses. Reading strategies were necessary in order for the students to be able to cipher out texts that seemed relevant for the

specific written topic, thus the students' reading habits were more strategic when reading as part of doing research for their academic papers. It is reasonable to assume that these findings might be transferable to a Norwegian school setting, as the study by Blikstad-Balas also indicated. Students have a different attitude to reading and using information when the aim is to write a graded assignment, as opposed to only reading for gaining knowledge about a topic (Blikstad-Balas & Hvistendahl, 2013).

The study concluded that computer familiarity did not influence the students' willingness to read on-screen. The study also found that the students were more inclined to read on-screen for academic purposes rather than as a leisurely activity. This last finding contrasts with the PISA study, where Norwegian high school students were found to make extensive use of screen-based reading for social and entertainment purposes and not so much with the aim of information and knowledge seeking (Frønes et al., 2009). These findings are similar to the data from the Blikstad-Balas study, as the students spent a considerable amount of class time on activities that were unrelated to the topic of a given lesson. These findings do perhaps also reflect the difference in context and academic status between university graduate students and youths in high school. Information literacy is an absolutely essential competency in academia.

Of course, the two research projects differ in both scope and selection of participants. The study conducted by I-Chia Chou was a qualitative study involving only six students and their screen-based reading for academic purposes. As reading is one of the most vital skills in higher education, the students naturally allocate a certain amount of time and resources to reading academic texts, as compared to high school students. However, the findings indicating that students apply reading strategies when reading for writing might be relevant also in a Norwegian school setting, as high school students frequently do research online as a

basis for written and oral work. The process of sifting through information does require that the student to some extent applies reading strategies. Moreover, the grad students in the study by I-Chia Chou have a similar relationship to the English language as Norwegian students, as English is a second language for both of these groups.

A large survey concerning the digital skills of high school students was done in Italy in 2007, involving 1000 high school students. The aim of the study was to examine whether and to what extent gender and family background affect the level of computer access and digital skills among high school students in the Trentino area of Northern Italy (M Gui & Argentin, 2009), in addition to examining the level of performance within digital skills among the students. The survey consisted of a test containing 85 test items centered on various types of digital skills in addition to a questionnaire with questions regarding socio-economic background and questions about computer access in the home.

The test items were constructed according to the following areas of digital skills: operational, theoretical and knowledge/awareness (M Gui & Argentin, 2009). The study revealed that there was a strong link between family education and access to computer equipment. When comparing data on family education and digital skills, the researchers did find differences that were slightly significant, yet only for the scores at both ends of the scoring scale, enabling the researchers to conclude that socio-economic factors to a greater extent influenced the level of computer access rather than digital skills (M Gui & Argentin, 2009).

It appears that skill levels are necessarily influenced by other factors than computer access. Gui and Argin conclude that, at least among younger people, the level of digital skills is going through a process of normalization, as the statistical estimates from the study indicate. However, the data suggest that the overall performance within the area of evaluation and information skills seem to be of concern. Even though Gui and Argentin point out possible weaknesses in the measurement

techniques for the examination of broader information skills, there is substantial research in support of the notion that young people struggle with the evaluation and information aspect of digital skills. As mentioned earlier, the information aspect of digital competency is termed information literacy (M Gui & Argentin, 2009: 20). The wealthy area of Trentino is quite comparable to Norwegian society, in that way that students in the study come from middle class homes equipped with personal computers. Norwegian students spend a considerable amount of time in front of their computers when they are at home, and most upper secondary students have individual laptops when they are at school. It is likely that Norwegian students might struggle with information literacy similarly to the Italian students.

2.3.1 My project in relation to the reviews

Surveys and large-scale tests are designed to test the general digital skills of students. Students are given tasks that are constructed to seem as authentic as possible, and the tests are designed to test specific digital skills. However, surveys are not sufficient in order to understand how high school students conduct their online research according to specific written assignments. Surveys have the power to give a general picture of how students perform at various specialized tasks; however, they do not indicate how students actually perform during their day-to-day online research activity in the classroom. While large-scale surveys do give an overview of the digital skills of a large number of students, such quantitative studies do not reveal how students conduct their individual search processes.

A qualitative approach involving interviews and observations serve the purpose of uncovering the mental planning and choices made by students. However, in the case of high school students as opposed to university students, they cannot be expected to have a highly reflective

view of their own research process. Also, physical observation is time consuming and its accuracy is limited to the observational skills of the researcher/data. By looking at browser log files in connection with written student texts, I hope to be able to explore the online research process of each participant during the course of an entire full-day English lesson, without having to let the students be reminded of the data collection process. My method of data collection is unobtrusive and enables me to collect the traces of online research in order to examine this process later.

In sum, the three studies in my selection of reviews all point to certain aspects of information literacy among students. However, none of the studies gives a detailed account of how students conduct their research online. The three studies in my review selection look at online research behavior from a descriptive level, by using surveys, interviews and video footage. None of the studies entails an up-close method of investigating the student research process in detail. My study takes a closer look at the research process through browser history files. By looking at browser log files, I am able to track the online movements of the students and take a deeper look at how they do their research.

When examining a phenomenon, such as for example online research among students, it is necessary to employ theories and models in order to be able to explain, rather than simply describe the phenomenon. Within the field of sociology, there are theories and terms that can be useful when analyzing data in order to give the data explanatory force. By applying the theory of mediated action by sociologist Jim Wertsch to my collected data, I hope to move beyond simply listing examples of online research, and rather explain some of the complicated relationships between students as agents and their online laptops as artefacts.

3 Agent and Artefact in the Classroom

3.1 Mediated Action

As a theoretical basis for my research project, I have chosen the theory of mediated action. The concept was originally constructed by Lev Vygotsky within the field of sociocultural learning theory. Jim Wertsch is one of the theorists who has subsequently developed and expanded the concept of mediated action.

The act of doing online research in class as preparation for a task can be viewed as a mediated action, where the student is the agent and the online computer and the search engine application are the mediating artefacts. Examining mediated action is a question of looking at how agents and cultural tools interact. My project centers on looking at how students interact with their computers during class time when they use their laptops in order to achieve specific goals. The agent uses the tool, which in turn results in the agent being changed by the tool. The students act with, and react to, the online environment through their research. Through the process of use, the agent develops varying levels of skills that require mastery and appropriation. I will return to these two concepts later in this chapter.

3.1.1 Cultural tools and their purpose

It is also a feature of mediated action that cultural tools are not necessarily created and developed for the purpose that they are being used for. The internet was not created for high school students to easily find accurate, reliable information to make use of in their assignments. Hence, the notion of information literacy has been developed as a cultural tool for people to operate as agents of mediated action involving the vast

amounts of information on the web. It is a question of "... *mastering the set of cultural tools provided to them by a sociocultural setting.*" (Wertsch, 1998, p. 37). The mastery of digital tools requires a high level of digital literacy which the students acquire to a varying degree in the classroom, depending on how and to what extent digital literacy is taught and assessed.

3.1.2 Constraints and affordances of the digital universe

Cultural tools are subject to change, which aims to overcome certain limitations inherent in the current form of mediated action. And, as stated by Wertsch, "*Any attempt to understand or act on reality is inherently limited by the mediational means we necessarily employ*" (Wertsch, 1998, p. 40).

By the introduction of alterations to current forms of mediated action, the constraints of cultural tools become evident in hindsight, after the current form has been revised and altered. Prior to the expansion of the internet, the production and dissemination of information was costly, and to gain access to a large audience was difficult in the analogue era. Due to these constraints, the information seekers evaluated information according to notions of authority rather than credibility. Evaluations based on credibility were easier to discern, as fewer instances had access and opportunity to publish information.

We tend to notice former constraints and affordances mostly after new tools have come into use, such as the case may be with digital tools in the classroom. Digital tools for writing, presenting and finding information yields far greater opportunities for gaining knowledge and enhancing skills compared to the manual method of paper and writing utensils. Yet, with the advent of digital sources as a fundamental ingredient in schoolwork came also issues of plagiarism and copyrights. These concerns can however to some extent be alleviated by the use of

digital plagiarism checkers, which are a built-in tool in the most widely used learning management systems such as It's Learning and Classfrontier. This thesis aims to look at another perhaps disconcerting aspect of digital media, which pertains to issues of source reliability and the structuring of online research processes.

As Jim Wertsch states, new cultural tools can “*alter the entire flow and structure of mediated action*” such as the case is with digital sources, rather than paper-based information, as a basis for written tasks in schoolwork (Wertsch, 1998, p. 43). Occasionally, new cultural tools can transform the mediated action to the extent that critics will ask the question whether the agent can be considered as participating in the action to a lesser degree than with the older cultural tool. The cultural tool has taken over the action in such a way that agents are considered to play a minimal role. This development is reflected by conflicts concerning plagiarism and the famous act of Copy & Paste in students’ written texts. Some teachers wonder as to what extent students can be regarded as authors of their texts when, for example, the origins of textual sources are not revealed in written assignments. Additionally, with the vast information access, competency aims and learning goals have shifted from cramming and knowledge accumulation to information literacy.

3.1.3 Mastery and appropriation as forms of internalization

In “Mind as Action”, the term “mastery” is preferred over “internalization” when used to describe how agents interact with artefacts. According to Jim Wertsch, the term “internalization” might be misleading, as it points to a process whereby mediated action progresses from an external plane, involving material artefacts, to an internal plane, where it disappears. The term “internalization” as a metaphor might therefore in some cases be loaded and misleading (Wertsch, 1998). Many forms of mediated action do not take place solely on an internal plane, such as for example riding a bicycle or pole vaulting, which is an example that is frequently used by

Jim Wertsch. Rather than alluding to a progression towards an internal plane, Wertsch prefers the term “mastery” or “knowing how” (Wertsch, 1998), which is a process whereby agents “...*develop systems of knowing how in such a way that explicit rules need not be invoked, placed inside the head of the agent ...*”(Wertsch, 1998, p. 52).

The term “appropriation” as used by Wertsch in “Mind As Action” is a translation of the Russian term “prisvoit” first used by Mikhail M. Bahktin (Wertsch, 1998, p. 53). These terms point to a process in which a user takes something that belongs to somebody else and makes this his/her own. This process can be illustrated by looking at how we use language. The word of language exist prior to a user’s utterance. The language is not neutral or objective, but exists in a human context where people make use of language in order to serve specific purposes in various social contexts. When using language, the user takes the language that circulates between humans and makes the language his/her own through utterances. However, due to the process whereby a user must take the language, which does not belong to him, and attempt as far as possible despite limitations to make it his/her own, the use of language as a cultural tool involves elements of constraints and affordances (Wertsch, 1998, p. 55). Similarly, the students who conduct online research during class attempt to make use of available info to the most useful extent by using information and literacy skills in order to turn pieces of information into important contributions to written texts.

3.1.4 Appropriation and resistance

"...although youth are talented and comfortable users of technology, they may lack crucial tools and abilities that enable them to seek and consume information effectively". (Flanagin & Metzger, 2007, p. 7)

"Cultural tools are often not easily and smoothly appropriated by agents, there is often resistance, and there is minimally something that might be called "friction" between mediational means and unique use in mediated action". (Wertsch, 1998, p. 54)

How does this "friction" become apparent in how students find and use digital sources? The digital universe contains various obstacles and diversions when students log on with the aim of finding relevant reliable information for their school projects. Appropriation and resistance in terms of mediated action is typically not always apparent to the agent (Wertsch, 1998, p. 57). Most internet users are not aware of the computer code that has gone into the creation and structuring of the information online. There is not only a multitude of information, but the technological aspects of web design and the algorithms employed by search engines are not necessarily visible or intelligible by the average internet user. However, there is evidently an actively engaging agent in the process of locating, sorting out and applying digital information.

3.1.5 Appropriation as information literacy

In some cases, mastery and appropriation and mastery are correlated at high or low levels, but in other cases, the use of cultural tools is characterized by a high level of mastery and low level of appropriation (Wertsch, 1998, p. 57). One example of a low level of appropriation correlated with a high level of mastery can be observed in the cases where students spend hours searching for info without using proper search terms and without applying suitable reading strategies for the texts

they encounter. In such a case, the student does master the technical tools; hence, the student has a high level of technical competency. Yet, the student is unable to put the technical skills to use in the service of finding purposeful information, due to a lack of information literacy. The notion of low and high levels of mastery and appropriation is parallel to high and low levels of computer literacy and information literacy. In this regard, mastery is connected to a high level of digital literacy in terms of technical skills concerning the use of search engines, whereas appropriation denotes the ability to locate, sort and critically apply information. The term appropriation in this regard can then be understood as level of information literacy.

The term "information literacy" is not mentioned in The National Knowledge Promotion curriculum. The document from the Department of Education rather refers to "digital skills", which encompass skills ranging from being able to use "...*digital tools, media and resources to assist in language learning.....*" to "*using digital sources in written texts and oral communication and having a critical and independent attitude to the use of sources*"(Kunnskapsdepartementet, 2013). The latter points to the highly specialized form of digital literacy, which, as mentioned earlier, is more accurately referred to as information literacy. The National curriculum does mention several aspects of information literacy, but the specific term "information literacy" is not used as the broader term "digital skills" is used instead. Most Norwegian upper secondary students have ample opportunity to refine their computer skills as they have widespread computer access both at home and at school, however, as previously mentioned they have challenges regarding information literacy. I would argue that it is worth looking into whether the term "information literacy" should be included in the National Curriculum and I will return to this issue in chapter 7 of this thesis.

3.2 Cultural tools and skills

3.2.1 Digital Natives

It is an unfortunate feature of the generational gap between educators and students that the young generation has been coined “the net generation” and “digital natives”, indicating that youth are experts at issues relating to the digital universe, whereas the older generation is still adapting to the digital era (Jones, Ramanau, Cross, & Healing, 2010, p. 723). This impression is shaped by the fact that youth are considered to be tech savvy and heavy users of the internet. However, this does not apply to every area of internet use. The belief amongst some educators that young people are tech savvy and have greater skills than their teachers overshadow the fact that students might have great skills in using PowerPoint and administering their social life through online social networking, yet struggle to find and make use of relevant online information sources. As evidenced by the PISA results regarding the reading of online texts among high school students, there are great variations in habits and purposes of internet use among teenagers (Frønes et al., 2009).

3.2.2 The Second Digital Divide

Researchers have formulated a new term that explains the discrepancy between technological competency and digital literacy within the field of computer use. Whereas the term “first digital divide” pointed to an uneven distribution of computer access among populations, researchers are now shifting their focus to the “second digital divide”, as computer access is now considered to be fairly even among young people across social and economic strata. The second digital divide describes the next step in the development of digital skills, as the challenge of digital competency is becoming increasingly centered on issues of information literacy.

Most young people today are seasoned internet users, and people in the age group 16-24 spend on average 170 minutes hours per day online on their home computers (Statistisk sentralbyrå, 2013). However, when exploring the skills of youth, it is important to separate the various forms of cultural tools that are at our disposal in the digital environment. When using the browser with the aim of finding information, the search engine operates as a main cultural tool. In parallel, when using Facebook in order to establish and maintain social networks, the specific Facebook community becomes the cultural tool. Yet, it is not fair to make such a distinction, as social communities online are rapidly becoming sources of information to more and more people. In my study, it is not possible to examine whether students use Facebook for research purposes, as the collected data does not give access to the students' activities on Facebook. The information from the log files regarding Facebook pages is limited to whether the user is looking at a picture on Facebook or another type of Facebook page.

However, when looking at websites visited by students during their class time, it is important not only to look at the credibility of the websites, but also of course the relevance, as this points to how efficient students are at finding information. The internet contains infinite possibilities for vernacular activities during class, as the study by Blikstad-Balas clearly reveals (Blikstad-Balas, 2012). The use of computers for entertainment purposes among American high school students is a growing problem. In the USA, The Federal Communications Commission is concerned about the online time wasting habits of high school students to the extent that they are considering a proposal to spend 200 million dollars on a program which aims to send thousands of digital literacy trainers out to schools and libraries (Richtel, 2012). Such time wasting activities are clear examples of the constraints and affordances of the internet. The digital landscape is scattered with possibilities to diverge from the original goal of the user to find relevant information. The list of

web entries that I have collected as data for this study can accurately indicate the extent to which students possibly their time ineffectively by visiting websites with material that is unrelated to the topic of their written assignments.

3.2.3 Unrelated websites and level of mastery and appropriation

The matter of using time on online vernacular activities is relevant to the field of digital literacy in class in a sense that the accessing of websites that are not relevant for the written assignment reduces efficiency, particularly in the case where students spend their class time doing online research. In the study by Blikstad-Balas, this type of online activity, which is not related to the topic of schoolwork, the researcher refers to this as “vernacular activities”. Regarding the accessing of unrelated websites online, it is relevant to view this phenomenon in light of appropriation and mastery. A high level of appropriation would indicate an ability to focus on the topic in question and not be distracted by the countless other websites on the Internet. Similarly, a high level of appropriation when looking at online research processes would be evidenced by a history file that reveals a certain level of credibility assessment. However, in contrast to the students in the study by Blikstad-Balas, my participants have English for a full day, which of course includes multiple brakes, as the students cannot be expected to stay focused for 5 hours. However, due to the accuracy of the log files, the data can give an indication of how information research is interspersed with vernacular activities.

As mentioned earlier, there are multiple techniques for assessing credibility, which are used simultaneously. According to K06, one of the competency aims regarding source use states that the student should be able to “*evaluate different digital resources and other aids critically and independently, and use them in own language learning*” (Kunnskapsdepartementet, 2013a). Students must view their sources in a

critical perspective and use these independently, and being critical of a source means using assessment strategies when looking for digital sources. In order to critically assess information online, it is necessary to look at several sources in order to corroborate and compare information, and information from highly credible sources require a smaller assessment effort than information from sources that are unknown. Students in upper secondary school do not have access to reviewed sources that often require a fee, nor do the students have the necessary academic skills that are vital in order to understand and make use of these sources.

The students in my study would have to rely on credibility assessment methods that require that they assess multiple sources on a given topic in order to decide upon level of credibility. Such an assessment process in class could be evidenced by web entries that reveal several websites containing information about the same topic. Consequently, the history browser file can point to the level of appropriation within an agent through the number of websites containing relevant information about a topic. Similarly, the list of sources at the end of the finished written text might indicate the use of credibility assessment strategies. Conversely, a browser history file with very few relevant websites can indicate that class time has not been spent on credibility assessment, or that the student has not made use of sources found during research in class. When looking at mastery and appropriation in light of vernacular activities, the level of vernacular activity is to some extent reversely proportionate with the level of appropriation, but might be proportionate with the level of mastery and computer competency.

When looking at the websites that are related to the topic of the written assignment, it is necessary to assess the credibility of these in order to explain how they might point a certain level of information literacy in a student. In my study, I analyze the websites from the browser log files in light of models for evaluating credibility. In the next

chapter, I present three main models for evaluating online credibility and explain how they can be applied to the data in my study.

4 Models for evaluating credibility

As a large part of the population and particularly young people have come to rely on, and trust, online information, it is evident that the information they find can influence power over the audience, as gathered info can be used as a basis for making more or less vital decisions within various fields of life. Particularly, the aspect of credibility is of great importance when users assess information (Metzger, 2007, p. 2081). There are multiple models that describe how information credibility can be assessed. One widely used model for assessment utilizes the checklist approach. Each item on the list contains a point regarding the source that the user must take into consideration in order to establish a sound impression of how credible the piece of information in question is. The approach is based on the assumption that credibility assessment of online info contains the same aspects as the credibility assessment of other types of info. From this perspective, the users must use the same assessment tools online as they do when they inspect information that is not digitally based. Another strategy for uncovering information credibility centers on the context, and is focused upon external factors about the information rather than the internal factors that the checklist approach emphasizes (Metzger, 2007, p. 2083).

4.1 The checklist approach

The checklist approach was framed by the digital literacy movement, including groups such as The National Library Association, the Literacy Agency and various types of consumer groups (Metzger, 2007). The common goal of these groups was to establish certain principles that could be of help to consumers who were looking for reliable information online. Health care organizations acknowledged the potential danger of having patients find incorrect or incomplete information online, possibly causing people to make wrong decisions regarding their health. Parallel, educators

and librarians witnessed a dire need for information literacy among students. The approach has been founded on some basic assumptions about the internet (Meola, 2004, p. 332).

Firstly, according to the checklist approach, the internet is lacking in standards, enabling anyone to publish information, with little possibility for users to evaluate the credibility of content. Secondly, the checklist approach is based on a view of the user as naive and highly vulnerable to fraudulent information online. Thirdly, the librarians are experts and therefore particularly equipped to teach credibility assessment to the audience. Hence, the checklist approach makes use of the same points that librarians use when they select material for the library collection. The checklist approach contains the following five points, which are believed to yield sufficient information about the credibility of a source: Accuracy, Authority, Objectivity, Currency and Coverage/scope. These points are accompanied with a varying number of questions that are supposed to assist the information seekers in assessing sources (Meola, 2004).

However, the checklist approach and the fundamental assumptions about the internet, which the development of the approach is based on, have been heavily criticized. Studies concerning the checklist approach have been made involving a small number of participants from academic fields performing specialized tasks online. Hence, the checklist approach does not reflect how the average person in reality goes about to assess credibility online (Metzger, 2007). A large-scale survey from 2002, with the aim of investigating how people perform real life information searches online, involved more than 2600 participants. During the study, the participants were asked to review two websites, comment on them and rank their level of credibility (Fogg et al., 2003, p. 3). The comments of the participants were categorized according to certain aspects pertaining to credibility assessment, and the categories indicate which aspects of the websites the participants emphasize during their credibility assessment.

According to the study, information seekers consider these top three issues pertaining to credibility: design/look (46%), information structure (28.5%) and focus (25.1%). Further down the list was company motive (15.5%), usefulness of information (14.8%) and accuracy of information (14.3%). It appears that the participants put far more emphasis on the superficial aspects of websites, such as design and structure, and far less emphasis on the accuracy of the information that was presented to them. Even further down the list of aspects pertaining to credibility came name recognition and reputation (14.1%), advertising (13.8%), bias of information (11.6%), tone of the writing (9.0%) and identity of site sponsor (8.8%) (Fogg et al., 2003, p. 5). It appears that several of the features of information credibility that the checklist approach makes use of are downplayed by the average online information seeker, in favor of design and layout.

On the other hand, when looking at the survey results according to website content, the results are more nuanced. When evaluating news sites, the participants gave information bias (30.2%) a more prominent role in their assessments. Similarly, when assessing opinion and review sites, information seekers emphasized information bias (23.8%) and information accuracy (25.4%) to a greater extent. Clearly, people to some extent assess information differently according to type of content. As Fogg points out, people generally do not spend large amounts of time assessing each and every website they visit (Fogg et al., 2003, p. 12). Rather, people develop strategies for quickly assessing credibility before moving on to the next site and it seems that issues related to design and structure are prominent features of these assessment strategies.

Regarding students in upper secondary school in Norway, it is likely that the students would put somewhat emphasis on assessing the credibility of their sources, as they are also aware of the information literacy competency aims of K06, which is part of their curriculum. In the

case of the participants in my study, they are obligated to publish their texts as blog entries online, which in turn can inspire the students to be more solicitous about the content they publish, as their classmates have access to the blogs. However, the degree to which students in school assess the credibility of online information depends on their level of information literacy, in addition to how and to what extent information literacy has been taught and how the teachers assess source use in written texts. The students who participated in my study had been instructed to always list their sources at the end of their written text. However, there were no particular requirements as to what kind of sources should be used, and source use was not the main objective of the written assignments.

4.2 The contextual approach

As Marc Meola points out in "Chuckling the Checklist: A Contextual Approach to Teaching Undergraduates Web-Site Evaluation ", the checklist approach is based on faulty assumptions about the state of credibility online. Meola argues that the Internet is not without standards, as it contains mounts of highly repudiated information sources. Additionally, students are not as gullible as information experts believe, as evidenced by surveys, which indicate that students are keenly aware of the shortcomings of much of the information online in meeting their academic needs (Meola, 2004, p. 334). Also, the checklist approach is arduous, with some versions containing over one hundred questions, some of which are not all suitable for online sources. In addition, as Meola points out, the checklist approach might make the information assessment process seem mechanical and algorithmic, as it seems as if the list of questions, when answered correctly, might render certain websites as having the utmost highest credibility compared to others according to how the information scores on the list of questions. In such a way, the checklist approach

might, at the worst, undermine the ideals of critical reflective thinking, which are a staple of digital literacy (Meola, 2004, p. 338).

As an alternative, the contextual approach takes into consideration factors that are external to the piece of information in question. The user is urged to look at the context of the source. The approach contains three points for source assessment: reviewed sources, comparison and corroboration (Meola, 2004, p. 339). The method of reviewed sources is centered on the information that has been vetted and peer-reviewed. Students are recommended to explore the databases containing academic texts that are of high quality and usually require a fee. Libraries at higher education institutions usually pay for access to these peer-reviewed article databases that are at the disposal of students in college or university. The list of questions from the checklist approach becomes redundant, as the fee-based peer-reviewed articles are almost guaranteed to have a certain level of credibility.

However, these fee-based databases consequently exclude the majority of online information seekers. As for the participants in this study, students in secondary school do not have access to academic databases through the school library. Whereas the fee-based web of peer-reviewed articles are an absolute necessity for students in higher education, these academic articles are unavailable to students in secondary school. Not only are they fee-based, but the academic language and research methodology makes the information difficult to understand for someone without knowledge about specific academic fields. The majority of online information seekers, including students in secondary school, can be said to depend on their information to be free and not too difficult to comprehend.

The methods of comparison and corroboration are suitable for free websites. Comparison entails looking at the similarities and differences of one or more sources in order to expand and deepen the knowledge about

a given topic. By comparing sources, students can achieve a sense of quality, by establishing standards that new sources can be compared to. Through the comparison of various sources, the students learn to grasp what constitutes quality in a source, and they are trained to detect bias. Information seekers work to construct and redefine their impression of reliability and accuracy (Meola, 2004, p. 340). In addition, the strategy of comparison enables students to get a broader impression of the kind of information available, as they locate information in various formats, containing different levels of detail about a topic. Source comparison serves to develop a keen sense of information literacy, as the approach enables students to get a sense of the diverse multitude of information in the digital universe.

Corroboration entails verification of one source against one or more other sources in order to establish a level of credibility. The technique is particularly useful in instances where reliability is in dispute, and it serves well in uncovering differing perspectives on a matter. Through corroboration, students are equipped to verify information and eventually attain sources with a high level of credibility. The corroboration approach is particularly well fitted to the multitude of information online, as the degree of usefulness of the method depends on the opportunity users have to access several disparate sources. As Meola states, a simple rule for students should be "do not use information unless you have corroborated it" (Meola, 2004, p. 342).

In summary, it appears that the contextual method offers a more flexible and effective approach to credibility assessment of online information. However, both of the approaches are particularly suited to the needs of students, academics and other information seekers who are motivated to find information with a high level of credibility. Hence, this target group of users is more likely to be willing to spend time and resources on finding credible sources. Unfortunately, this attitude is not

the norm among internet users. Generally, internet users are not willing to put effort into sources assessment and do not extend their credibility assessment far beyond site design.

However, the level of assessment done by the average internet user is largely determined by ability and motivation (Metzger, 2007, p. 2088). Information seekers will make use of assessment strategies ranging from points on the lists of the checklist approach, to external factors from the contextual approach and, perhaps more frequently, simply apply a heuristic strategy based on design and structure. Choice of strategy depends on what the user is risking by utilizing information of low credibility. Regarding students in upper secondary school, their information needs and assessment skills differ from undergraduate students and adults. If and how the students in school apply credibility assessment strategies depends to a large extent on the training they have received, and also on how much the teacher emphasizes the use of sources when assessing schoolwork.

4.3 Information credibility in the age of online social networks and collaboration

Studies examining online information credibility have largely been focused around the perceived credibility of websites, and have failed to consider a wider range of information sources, such as wikis and blogs. Previous research has also examined the information seeker as an isolated individual, and not taken into consideration the social and connected aspects of the Internet (Flanagin & Metzger, 2007, p. 10). In order to better understand information credibility and how people online apply assessment strategies, it is necessary to construct broader categories for online information credibility; categories that also include sources that originate, and are disseminated, through social networks and platforms of collaboration. Indeed, much of the activity online tends to increasingly

center on online social networking, spread across various devices, such as smartphones and tablets. Young people in particular are becoming increasingly dependent upon social networking platforms in their day-to-day activities (Flanagin & Metzger, 2007).

In the article "Digital Media and Youth: Unparalleled Opportunity and Unprecedented Responsibility ", Andrew Flanigan and Miriam Metzger propose a set of new categories of assessment strategies that are at the disposal of information users today, based on a networked digital universe where credibility assessment is shared. The process of personal endorsement within smaller groups is a highly effective way to establish credibility among group members. However, on the internet, containing a vast number of users who are often anonymous to one another, credibility endorsements take different forms (Flanagin & Metzger, 2007). As a continuing group of Internet users, and young people in particular, have come to depend on their online social networks for communication as well as locating, assessing and conveying information online, the assessment strategies delineated by Flanagin and Metzger are useful when analyzing the history browser files of the upper secondary students in my study. However, the data used in my study does not reveal how the students have possibly utilized social media for research purposes.

As pointed out by Metzger, digital media have not so much changed what skills are needed to evaluate the credibility of information as they have changed the need for people to know how and when to exercise those skills (Flanagin & Metzger, 2007, p. 12). The core issues of credibility remain the same as before the digital era, and the necessity for users to apply their critical faculties is similar to the situation before. However, the question of how and when to apply the proper assessment strategies pertains to the level of appropriation in the user, as previously mentioned in the theory chapter of this thesis. Students do know that much of the information online cannot be trusted, yet, the question of

identifying untrustworthy sources and the strategic application of their critical faculties is not always clear to students. The assessment strategies listed by Flanigan and Metzger illustrate how appropriation within digital literacy is marked by the emergence of online networking and sharing, and is a vital element in understanding how young people develop information literacy.

In “Digital Media and Youth: Unparalleled Opportunity and Unprecedented Responsibility”, Flanigan and Metzger list the following four forms of credibility online: Conferred, tabulated, repudiated and emergent:

Conferred credibility is a kind of credibility that is created when certain agents, such as organizations, associations and agencies confer credibility upon a source. Examples of this is when a teacher recommends a website to a student, when an organization recommends a specific vendor or when consumer protection agencies rate online merchants according to certain business standards. Conferred credibility arises when specific entities make use of their expertise in order to approve information sources. The level of credibility that arises through this form does depend on the reputation of the recommending entity. However, if consumers are unaware of the pretenses of the conferring entity, such as for example in the case of bloggers being sponsored without disclosing this to their readers, credibility might be established on false grounds.

Similarly, with the tactical placement of ad banners, using advertisement tools such as Google's AdSense, information seekers might not be fully conscious of how the search engine can place advertisements related to search terms on top of the list of hits. These ad banners are marked as advertisement, yet, information seekers will be disadvantaged if they are not aware of how these advertisements function and to what extent these tools make use of data mining in order to target certain audience groups. Some information seekers might get the impression that

Google has conferred credibility onto the merchants and service providers that have placed the ad banners.

Tabulated credibility is based on a rating system where the audience, whether it be individual members or larger entities, give scores that are counted to indicate an overall score, forming the basis whereby users can compare quality based on a hierarchical rating system. The auction website Ebay uses tabulated credibility as a method for consumers to find the most trustworthy sellers, and for its sellers to possibly weed out difficult customers. Tabulated credibility is generally used extensively by websites offering customer reviews and peer-ratings. Some websites urge users to rate other raters in order to provide a more nuanced and fair rating system, where it is possible to probe the quality of a given review or rating. In such a way, users can earn a reputation as being more or less accountable raters, which in turn can strengthen or weaken their potential for granting credibility to products, services or merchants.

Repudiated credibility is maintained through personal or social networks. As Metzger and Flanigan point out, "a good reputation is a powerful source of persuasion" (Flanagin & Metzger, 2007, p. 11). People are quick to trust recommendations from people they know. However, when speaking of repudiated credibility of information sources, people are not always able to pinpoint exactly how they have come to find a certain source credible, but rather it seems that consumers form an impression of repudiated credibility through more general recollections or from credibility cues accumulated over time. It appears that people have come to rely on their social networks for cues concerning the credibility of information sources. In such a way, information seekers are swayed by repudiated credibility towards the sources that manage to build a good reputation. Indeed, online social networks are an arena where reputation spreads quickly, hence moving parts of the marketing power over from marketing firms into the hands of consumers themselves.

In terms of establishing repudiated credibility, sources must take great care to establish a good reputation for them to let this spread through social networks. Additionally, repudiated credibility creates a form of transfer effect, where consumers transfer credibility from one media, or a specific product, onto other products within the same media or specific media product, so that the good reputation of one source trickles down and spreads to other aspects of that source or other associated sources (Flanagin & Metzger, 2007). One good example is the New York Times, which by many has earned the reputation as one of, or possibly, the best, newspaper in the world. Through repudiated credibility, the journalists working for the newspaper will be considered highly credible. In turn, the links that the journalists put in their newspaper articles and blogs will have some of the repudiated credibility of the New York Times transferred onto them.

Emergent credibility, similarly to repudiated credibility, also depends on social networks and cues for establishing and maintaining credibility. The emergent form of credibility, is described as "*...a phenomenon that arises from a pool of resources, achieved through a system of open access to all* " (Flanagin & Metzger, 2007, p. 12). One of the most famous of these information sources is the online encyclopedia Wikipedia. There are also numerous social networking sites and forums which contain large repositories of information collected, generated and distributed by its users. Credibility arises through the open-access and largeness of the information pool, which in turn might instil a sense of credibility assessment in users, as they are aware of the collective, self-governed aspect of the source. Users are aware that the information has been constructed and is maintained by different authors with varying perspectives which, to a greater extent than other forms of credibility, demands a certain level of information literacy in users.

Regarding Wikipedia, the study by Blikstad- Balas and Hvistendahl points to some interesting findings. All of the students in their survey reported

that they use Wikipedia as a source of information, as it is easy and quick to use. However, they do not necessarily view it as having a high level of credibility, and they are aware that many teachers do not approve of Wikipedia. In light of the new and emerging online forms of credibility, could this possibly point to a generational gap to some extent? Teachers are academics and have learnt and used the more advanced credibility assessment strategies. However, in light of the contextual approach, it might benefit the information literacy of students to make use of Wikipedia as an initial source, followed by a process where they compare and corroborate info from Wikipedia with other sources.

In the next chapter, I explain the aims of my study and my choice of method. The models for evaluating credibility form a point of departure for my analysis, as they are used in order to make the collected data tell me something about the level of information literacy within the students. The models I have presented in chapter 4 form the basis for my choice of method, as they serve to analyze the content of the log files and the source lists of the written texts.

5 Aims & Method

I have chosen a rather untraditional method of investigating the topic of digital research among upper secondary students. Other studies on digital literacy among students have, as mentioned earlier in this thesis, mostly utilized qualitative approaches such as interviews and observations in addition to quantitative approaches in the form of large-scale surveys and batteries of tests, such as PISA. My method of choice is qualitative and based on content analysis.

5.1 Reason for choice of method

“Content analysis focuses on analyzing and interpreting recorded material in order to learn about human behaviour” (Ary, Jacobs, Razavieh, & Sorensen, 2009, p. 29). The human behavior in question is the process whereby students in upper secondary use the Internet for research during class time. It is an approach that does not serve to generalize about online research in school in general. The aim of the method is to gain a deeper insight into a phenomenon and attempt to recognize certain characteristics of the material. As stated by Hsiu-Fang Hsieh and Sarah E. Shannon in the article “Three approaches to content analysis”, qualitative content analysis is defined as a research method for the subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes or patterns (Hsieh & Shannon, 2005, p. 1278). I have not found any other study within this field that has made use of browser history files as data, consequently it appears that the use of browser data fills a methodological gap. It is an unobtrusive method for collecting data, where the data resulting from mediated action, is logged by a computer. The mediated action done by the students leaves traces that can be copied and restored on the researcher's computer. This type of data gives a very detailed and

accurate overview of which sites the students have visited at various moments during a given period of time.

5.2 Sample

When exploring ways of finding participants for this study, I contacted the department of the teacher education program at the University of Oslo. The PPU teacher training program cooperates with a large number of upper and lower secondary schools in the Oslo and Akershus regions. The department gave me a list of schools, where the PPU students at the University of Oslo have their practicum. From this list, I acquired the contact details of all the Upper Secondary schools in Oslo and Akershus that cooperate with the University of Oslo. As it can be difficult for master students at the teacher training program to find participants for their research projects, I assumed the schools that were affiliated with the teacher education program at UiO perhaps would be more inclined to participate in a research project. E-mails requesting English teachers to participate in my study were sent out to a total number of 43 upper secondary schools in Oslo and Akershus. The email requested that one English teacher and 4 – 6 students from the teacher's class participate in the study. One English teacher responded rapidly to the request and was ready to start the information gathering as soon as possible.

The teacher who volunteered had taught English in upper secondary school for several years and was the head of English studies at her school. During her English classes, the students made use of their school laptops for writing and doing research. The school practiced a system of teaching time between 08:30 and 14:00 with full day single-subject classes. The participant for my study taught English to a second grade class each Tuesday. The class was given written assignments each week, which they were to publish as blog entries on a blog platform chosen by the teacher. Four students from the class volunteered to participate in my study,

granting me permission to download browser history files from their computers each week during the course of three weeks.

5.3 Gathering Data

All four students used their school laptops during class. Their web browser of choice was Chrome, and they used this browser exclusively when doing research for their written assignments. The history file in Chrome can be located under the "settings" button, symbolized by a small gray cogwheel in the upper right corner of the browser window. The log file can be found under the title "History" by scrolling down the settings menu. When clicking "History" or simply using the hotkey "CTRL + H", a long list of visited websites will appear. The entries are time-stamped and listed chronologically. By right clicking on the page containing the entries, it is possible to save the entire list of entries. However, depending on how many web entries per day, varying number of days will be displayed per page.

When collecting the browser data, I copied the list of entries and saved the file in a HTML-format on a memory stick. The HTML-file enabled me to click on the file and then have the list of entries appear in the browser window on my computer when I later accessed the log file in order to analyze the visited websites. After having opened the HTML-file in my browser, I was able to click on all the website addresses in the list in order to analyze them. The data collecting was done in the morning on the day the written tasks had been completed, which was one week after the students had been given the task. The completed written tasks were copied from the respective blog website in the HTML-format and saved to the same memory stick. On the third day of data collection, the students were to do their term test in English. The teacher sent the completed term test papers of the four participants per e-mail.

5.3.1 Organization of Data

The data was collected during three visits to the class over the course of five weeks. The first set of data was copied and saved to a Microsoft Office doc.-format. The following two sets were copied and saved in an html-format, which proved to be easier, as the html-file could be saved directly to the memory stick without going through the process of saving the history files to a Microsoft Office word document.

Day 1 (Browser history from October 18th)

The first day of data collection yielded browser history files from three of the students, as the browser history file from the fourth student could not be copied. It appeared that the browser setting on the fourth student's laptop was set to automatically be cleaned at regular intervals. The browser history files were saved to my memory stick in a doc.-format. The topic for the written task the students were to do during English class that day was a blog entry about social media.

Day 2 (Browser history from October 25th)

On the second day of collecting data, the files were saved as html-files. Again, the list of entries from one of the four students was incomplete. It appeared that only a few of the entries from the list were saved to the memory stick, for unknown reasons. The topic for the written task the students were to do during English class that day was a review of the film "Gran Torino".

Day 3 (Browser history from preparation for mid-term test)

On the last day, I collected the history files from the preparation period before the Christmas test. The students had been given information regarding the written test, which they were encouraged to use as a point of departure for their own research. The students were allowed to bring

any sources they wished for the written test. They were not allowed to use internet during the test, but were encouraged to find relevant sources prior to the test. The four students had done varying amounts of research as preparation for the test. One of the students had not been given information regarding the topic of the exam, and had consequently done very little research prior to the test.

The history files were coded using the letters A, B, C and D, where each of the students was assigned a letter. Additionally, the history files were further coded according to which day they were collected, indicated by the date of collection.

5.4 Content analysis

The content I use for analysis in this study consists of browser history files and written texts in the form of blog entries, which the students publish on the Internet themselves. My approach to these data is a directed type of content analysis. The method of content analysis can be divided into three subcategories as described below: conventional, directed and summative (Hsieh & Shannon, 2005, p. 1278).

The summative approach can be used when the aim of a study is quantification, such as counting the use of particular words or content, in order to examine usage. However, the summative approach goes beyond the quantitative approach of mere counting content, and aims to explore the underlying meaning of content by viewing the data in light of context (Hsieh & Shannon, 2005, p. 1284). A conventional content analysis takes the form of an inductive approach, where the aim is to describe a phenomenon, often in cases where existing research and literature about the phenomenon is lacking. In contrast, the aim of a directed content analysis is to validate or expand existing theory. The directed approach has existing theory or research as a point of departure. The theory can be used to identify some key categories that can function as a guide to the

construction of operational definitions and variables, hence the approach has been coined “deductive category application” (Mayring, 2000)

Regarding directed content analysis, the approach enables two kinds of strategies to be used when analyzing the data, depending on the research question. The first strategy requires that the researcher finds all occurrences of a predefined phenomenon, before sorting these findings into already established categories, and finally gives new codes to the data that cannot be sorted into the predetermined categories. This strategy is appropriate in cases where the researcher wants to be sure to include every instance of a phenomenon. With the second strategy, the researcher begins coding immediately, thereby identifying the data that easily fall into the categories of predetermined code. The remaining data are then examined in order to determine if these data fall into a subcategory of existing codes, or if the data require a new category to be constructed. The second type of strategy is suitable in cases where the researcher is confident that the existing categories are substantial enough not to bias the categorization of new data (Hsieh & Shannon, 2005, p. 1282).

I have chosen the second strategy, where the researcher begins coding immediately and then determine if the remaining data fall into a subcategory. The phenomenon I am examining in this study is the act of researching information for a written task about a specific topic. I have therefore analyzed the websites from the history files in order to underline all entries that have content pertaining to the topic of the written task. Entries that require a login, such as Facebook profiles and email accounts are therefore not underlined, as I do not have access to the information on these sites. They form a separate category, along with other sites on the history list that do not have content related to the topic of research.

5.4.1 Validity

To what extent do the log files from the students' laptops indicate how students perform research online? Some of the students complete the task during class time, whereas others need more time and often complete their written tasks at home. For this reason, the log files are not necessarily an exhaustive list of all the websites the students have visited in order to complete their assignments. Students have access to smartphones and computers outside of school, which they can use for online research. Also, the students might install several browsers on their school laptops and use these browsers interchangeably. The students in my study however used Chrome exclusively, and did not have any other browsers installed on their computer. The class was given the entire school day to finish the written task, and the students worked on their essays throughout the day, even though not all four students had completed their essays by the end of the lesson. Therefore, the log files only indicate which sites have been visited during class time, and the browser history does not offer data on online research done after a lesson.

5.4.2 Reliability

How trustworthy are the data? Perhaps the one factor which might reduce reliability to a greater extent is the possibility of the students to manipulate the list of visited websites by deleting entries they do not want to be included in the study. Additionally, there is a risk of students avoiding certain websites they would normally have visited because they know someone will look at their browser history. This risk has been reduced by giving the students information regarding their status as anonymous, and also emphasizing the fact that the research project does not affect the assessment and grading of their written assignments in any way.

5.4.3 Ethical considerations

When looking through the history files that I had downloaded, I quickly realized that browser log files yield lots of information about the person surfing the web. What kind of websites a person chooses to access says something about that person's interests and views. A browser log file gives evidence of what kind of information a person has taken in, hence what knowledge the respective person has acquired. In such a way, browser history files become revealing. Although it is impossible to paint a broad picture of a person by examining which websites the person has been looking at during the course of a few hours once a week, it does feel like looking into something private. The students in my project usually surf the internet individually, except in the case when some of them have forgotten to bring their laptop. Consequently, the browsing experience is personal. It is also a feature of the web experience that going online from site to site can be a fleeting and transient experience, where the user might not necessary be affected or interested in the content. It is impossible, by examining browser history files, to know what kind of influence various web content has had on a user, as this is highly subjective and can only be revealed with a different approach such as interviews and questionnaires.

Still, the act of looking at the browser log of somebody else is a solemn experience, which the person who originally visited these websites does not have any control over. The log files are imprints of another person's stroll through the digital universe, and the kind of choices the person made on the way. Particularly in an educational setting, where teacher and students to a varying degree have a common goal of spending class time effectively, the log files can be interpreted as evidence of how effective the time in class has been spent. Naturally, on the first day of data collecting, a couple of the students who volunteered did appear slightly nervous when their history file contained a long list of Facebook entries. However, it is my responsibility as a researcher to

respect the dignity, rights, privacy and sensitivity of the human subjects in my research (Ary, Jacobs, Razavieh, & Sorensen, 2009, p. 590)

6 Data & Findings

As mentioned earlier, the collected log files were from the research the students had done on the same day as they were to write their texts. The class had a full day of English and was to publish their written assignments on the school blog. The students wrote blog entries during the first two weeks of data collection. On the last and third day of data collection, the students were to write an essay for their term tests. Before the test, the class was notified of the topics they would encounter on the term test, in order for the students to be able to prepare themselves for the essay questions on the test. The first blog post assignment the students were given was to write about the topic of "social media". The second assignment was to write a film review about Gran Torino. The essay questions on the term test were related to the topics covered during the first semester of International English, such as social media and global issues.

Before presenting the findings from the log files, it is useful to return to the research questions to clarify what I am looking for when analyzing the log files. My research statement contains the following two questions:

- How do upper secondary students do research online?
- How do they make use of sources in their written work?

I attempt to answer the first question by looking at what kind of websites the students visit and how they find these websites. It is fairly standard practice to type in search terms in the search engine in order to find websites, or websites might be linked to from other websites. Regarding the second research question, I have looked at whether and to what extent the students have referenced and listed sources in their written texts.

The following chapter contains presentations of the data, both from the log files and the written texts. In this chapter, I occasionally make use of the before mentioned models of credibility assessment in the cases where the credibility of websites serves to indicate a certain level of information literacy in a student. However, the chapter is mostly descriptive. In chapter 7, I move on to discussing the data and use the theory of mediated action in connection with models of credibility assessment, in order to try to answer my research questions.

6.1.1 Student A

October 18:

The student has not used any written sources in her blog entry about Social Media. However, the student has utilized pictures from the Internet to illustrate her blog. This is in accordance with the history file from the given date, which reveals several searches on Google Images but no searches for any source texts relevant for the written text. The finished text about social media is illustrated with a photo; however, no sources have been referenced or listed.

October 25:

The first entry in the log files is a Google search for the term "refugees", indicating that this search term is connected to the film the class has seen. The search term "refugees" appears in the log file only once, and the initial list of google hits produced by the search term is not followed by any of the websites the search has yielded. This could indicate that the student has looked up a word in order to find a quick definition, as the first websites on the list of hits are displayed with two lines of the website content. Wikipedia, which is the first website on the list of sites Google returns when using the search term "refugees". In this case, it is not necessary for the student to click on any of the websites, as the initial

display of the list of websites reveals sufficient information in order to read the definition of the word, as it is explained by Wikipedia, and also numerous international organizations which are involved with refugees.

It is interesting to look at how a simple Google search instantly displays the various definitions of the search term in the way that it is used by interest organizations. Compared to looking up a word in a dictionary, the online search engine adds context to the search term through situating the term according to how the term is represented through organizations. By just looking at the list of hits in Google, the list yields information for a quick reference to the extent that it is not even necessary to visit any of the listed websites. In terms of exercising digital literacy, the form in which Google displays the search results might to some extent reduce the information literacy potential of the information, as the student finds it unnecessary to take a closer look at the list of web entries.

The next relevant entry in the list of websites is the website for "Gran Torino" at www.imdb.com. The International Movie Database is the largest film database in the world. It contains a list of technical data for "Gran Torino", a plot synopsis, photographs and video clips from the film, numerous links to reviews and articles about the film and also a forum where registered audience members can discuss the film. When looking at IMDB in light of source credibility assessment strategies, it is evident that the website might be granted credibility through multiple forms of credibility assessment. Firstly, IMDB, as the largest movie database in the world, with more than 160 million unique monthly visitors (<http://www.imdb.com/pressroom/about>), and consequently, through its sheer size, benefits from repudiated credibility. It also features both a standard consumer site, www.imdb.com in addition to an IMDB pro version, www.imdbpro.com, the latter being designed for professionals within the entertainment industry. The pro version of IMDB confers

credibility onto the info in the consumer version, particularly as evidenced by the mix of both very specific and highly technical information about "Gran Torino" and more general info about the plot. The website also promotes a third form of credibility, through the audience rating system, where the quality of a film might be judged by the tabulated credibility that arises through the rating system of IMDB.

When looking at the history file, it is evident that IMDB has been used more as a quick reference than a point of departure for more extensive research about the film. There is one google search with the combination of the two search terms "Gran Torino" and "IMDB". The student has used Google as a tool for quickly finding the film on the IMDB website. The log file reveals that there are no more relevant hits for the next 2 hours and 45 mins. Following the two relevant hits from IMDB, there are 5 web entries which are entirely unrelated to "Gran Torino", one of them being a job advertisement website, another being a social media website, a third being a career advancement website and the fourth website is from a mobile operator company. It appears that the student has opted for a break after having done a little research in the form of quick references.

After a period of absence, new hits appear in the log files. There are four hits connected to Gran Torino, and they are all searches from Google image search. The student has searched for pictures to use for illustrating the blog text. Some of the pictures from the search can be found on the student's blog. The next web entry is regarding study materials for the film, which the teacher has linked to from her website. There are no relevant web entries after the link to the study guide, which indicates that the link has not been used as a point of departure for more research on the film. The written blog entry, which the student has written on this day, does not contain any source references or any source list, which indicates that no textual information sources have been used.

November 22

On the day of the term test, where it appears the student has searched for info about the topic of social media that has been covered during the fall semester of VG2 International English. The log files reveal that the student has accessed It's Learning three times at the start of the day. Next, the log files contain 9 hits for various sources related to social media. The first hit reveals a search on www.wikipedia.com about the topic "Social media". The next hits contain articles that have been linked to in the list of sources at the end of the article on Wikipedia. It appears that the student has used the links on Wikipedia as a point of departure for a more in-depth search about social media. This might point to an idea of Wikipedia's form of emergent credibility as unsubstantial when being used as an information source in a written assignment. The first article is titled "What is social media" on www.webtrends.about.com. The next is a text titled "The political Power of Social Media on the website www.foreignaffairs.com". The magazine Foreignaffairs is of high repudiated credibility and specializes in foreign policy and USA's role in the world. It is published by the Council on Foreign Relations, which is considered to be one of the most influential foreign policy think-tanks in the world (Lobe, n.d.). Following Foreignaffairs is an entry containing the article "A brief history of social media on www.copybrighter.com". Copybrighter is a company specializing in online search optimization.

After the mentioned articles comes an entry showing a search on the search engine www.ask.com where the search term "Social media" has been used. Apparently, the student here has made use of a search engine different from the frequently used Google search engine. The next three hits are from Norwegian newspapers. The first hit is from www.aftenposten.no and it is an article titled "Google tjener 171 millioner hver dag". The last two hits are from www.dagensnaringsliv.no, containing one article titled "Google kjøper 1000 IBM patenter" and another one about employment at the Google company titled "Fra Grorud

til Google". The Norwegian newspaper articles are followed by one final site, www.bbc.com, where the log file shows that "social media" has been used as a search term on the news website. However, the log file does not show any further websites from BBC. Regarding the level of credibility of these sources, both the Norwegian newspapers and BBC have a fairly high level of repudiated credibility. Aftenposten is one of the three largest newspapers in print in Norway, whereas Dagens Næringsliv is one of the largest Norwegian newspapers specializing in business reporting. BBC is a British public broadcasting company and is one of the oldest and largest broadcasting corporations in the world.

The online search activity is rounded off by a visit to the International English school blog where the students usually write individual entries during class. The next log file entries consist of It's Learning, OneNote and Microsoft's cloud storage service SkyDrive, This could indicate that the student accesses, and possibly saves, information on a place which is readily available during the test. After the final web activity on these services, there is a gap of almost 4 hours. Finally, the delivery of the term test is evidenced by a file upload to It's Learning.

The topic for the essay the student had written during the term test was "Social Media in our Daily Life". The sources listed for this essay are limited to the student's own school blog in International English. The source list at the end of the essay does not contain any of the source texts that were retrieved before the starting time of the term test. Moreover, the essay does not contain any references to sources.

Student A Summary

The first day of search is marked by picture searches where Google has been utilized to find pictures and not textual information. One picture source has been used, but not listed, as illustration for the text. In contrast, the next day of research shows evidence of information search, where the student has used www.imdb.com as a source of info about the

film. The research is limited, however, to IMDB, and the Google picture search in order to find photos. The third day of research shows a greater variety of texts, where quite a few of the sources are in Norwegian. Due to the variation in sources, it appears the student has searched for information about social media rather randomly, and none of these sources have been used in the term test essay. In sum, student A seems to have a rather low level of information literacy, as the level of research is somewhat superficial on day one and two, whereas the research for the term test essay on day three seems to be marked by an accumulative strategy, as the sources have content about social media from very different perspectives and angles. The term test essay does not contain any references in the text or a source list.

6.1.2 Student B

October 18

The student starts by logging on to the International English blog. Next, there is an entry that is seemingly unrelated to the topic for the written task the class has been given, as it is an entry for a mobile phone operator company. For the next 1.5 hours, there are 8 hits for Windows Hotmail, one hit for YouTube containing a video clip related to a Norwegian news story, and one hit for It's Learning, indicating that the student has not done research for the given topic during this time.

After 2,5 hours into the lesson, there is a web entry which shows that the student has used Google Translate in order to translate a word into English. It appears that Google Translate in this instance has been used as a bilingual dictionary in order to find out what a specific word means in English. Consequently, the service has not been used to translate longer pieces of text from Norwegian and into English, as there has been some criticism of using the translation service as a tool during written assignments. Following the Google Translate entry are 8 hits for

newspaper articles in the two newspapers www.vg.no and www.budstikka.no. These hits indicate that the student has opted for a break, it might possibly be a lesson break, as the newspaper articles are not related to the topic of the written assignment. However, quickly after the newspaper articles, the log files contain two web entries which show that the student has done research on the topic. For this research, the search engine Google has been used. The two hits are the first entries since the start of the lesson that are relevant for the given topic.

The first search term that has been used is "facebook brukere i verden", which naturally yields information in Norwegian. The student has accessed a website that is number two on the list of hits in Google, www.synlighet.no, which contains an overview of the number of Facebook users nationally and internationally. The website is owned by a company that sells online marketing services and focuses specially on search engine marketing. The company also offers a free brochure with a statistical overview of many aspects of social networking online. It is clear that the website www.synlighet.no does have a commercial interest in the information presented regarding the number of Facebook users.

After the two websites about Facebook, the log files show that the student 10 minutes later logs on to a blog about a project the student is working on in a different subject. This happens approximately one hour before the English lesson ends. Apparently, the student has shifted attention towards a project outside of English. It appears that the student is collaborating using It's Learning and a blog platform where the students publish work related to a course in marketing. Also, the log files contain 6 entries from Skolearena, indicating that the student accesses info from the school administration. Judging by the fact that so many of the web entries during the remaining hour of English class are not related to the topic of the written task, it is clear that the student uses the internet for other purposes than to do research for the English assignments. The student blog does not contain any entries about the given topic, which

indicates that the student has not completed the written assignment.

October 25

There are no log files from Student B from this day. The blog entry from that date does not contain a source list. Rather, the film review contains portions of plot synopsis and personal reflections about the film.

November 22

This student admitted to having had little time to do research before the term test, as the student had not received information about the topics the class was to prepare for. Log files show 81 hits for Facebook profiles and pictures during the 30 minutes prior to the start of the term test. During the 20 minutes leading up to the start of the test, the student has made 17 searches in Norwegian, related to the topic of racism. The total number of sources about this topic is all in Norwegian, and it is unclear whether the search results are to be used in an English text. The topic of racism is not relevant for the essay the student has written for the term test.

However, following the 17 websites about the topic of racism, the log files show a large number of hits for Google Translate. There are 14 hits for Google Translate, whereas in 13 of these entries, the service has been used in order to translate phrases, sentences and longer pieces of text from Norwegian and into English. 5 of the entries contain a translation of one long sentence spanning 3 lines. The sentence has been slightly altered from one entry to the next, and the translated version does contain a few syntax and grammar errors. The sentence can be found in the first part of the term test where the sentence has been used as part of one of the answers.

Similarly, three of the Google translate entries contain a Norwegian sentence which has been slightly altered and translated into Norwegian.

The sentence can be found in one of the answers on the term test. Finally, in the remaining five entries for Google Translate, the student has utilized the service in order to translate clauses and expressions, where three of the translations can be found in the answers on the term test. In sum, the answers on the first part of the term test contain four pieces of text that have been written with the help of Google Translate.

The use of Google Translate in these cases is slightly puzzling, as several of the translated clauses and sentences are at a level that is quite suitable for upper secondary school, and not considered to be advanced for the level. Three examples of this are "Engelskkunnskaper" which has been translated into "english skills", and "foregår" which is "takes place" in English, and lastly "være avhengig av" which has been translated into "depend on" and "addicted to". A reading of the term test essay written by the same student as final part of the test indicates that the student is proficient in English on an upper secondary school level that would yield a high score in written language competency. The web entries related to Google Translate creates some questions regarding the usefulness of using Google Translate when considering the fact that the service returned English clauses and a sentence containing syntax and grammar errors. These errors were not transferred to the answers on the term test by the student, indicating that Google translate does require a certain level of language proficiency in order to be a useful supplement when writing English. One the source list from the term test essay, the student has listed OneNote notes as a source. OneNote is a Microsoft online note taking service, which indicates that the student has relied on her own notes as a source of information for this essay.

Student B Summary

During the first day of research, the web pages that are relevant for the topic of the written assignment are limited to Google Translate and one commercial website containing statistics about Facebook. The high

number of other hits from this day are largely irrelevant for the topic of the written text, and there are also some hits for social networking sites. The hits for online social networking sites continue on the day of the term test. Following the networking sites are quite a few searches in Norwegian, but these searches are not relevant for the term test essay.

Oppositely, the next websites from the log files are from Google Translate, where the student has used the service in order to translate both words and sentences into English. A few of these translations have been used in the term test essay, although the translations are not in advanced English and not considered to be challenging for a student in upper secondary school doing VG2 International English. In sum, based on the log files, it appears that the student displays a low level of information literacy as there are few sources that are relevant for the topic of the written assignments. Conversely, there are quite a few irrelevant websites, including social networking websites, indicating that the student has focused on material that is alternative to the content of the English lesson.

6.1.3 Student C

October 18

The first entries in the log file are time-stamped one hour after the start of the lesson, and the first four web entries are from Facebook. History file reveals that the student has accessed a variety of websites during the course of the lesson. During the next three and a half hours, there are 7 hits for Facebook. Also during this time, the student has visited www.turistforeningen.no, www.allposters.no, a personal blog, which is related to one of the speakers who will give a talk at the school, and also a website which streams American television series. In addition to this, the student has also accessed a Facebook page for one of the Norwegian classes at the school; this could indicate that the student is somehow

preoccupied with work in another subject. The first web entry that is relevant to the topic of social media is time-stamped three hours and 45 minutes after the start of the lesson.

The relevant web entries consist of Google picture searches. The student has searched for images using the search terms "social media" and "networking", and there are five picture search hits in all. However, there are no searches for text or other types of information related to the topic. Throughout the entire lesson, the research process of the student has yielded five different sources of pictures to accompany the written text, but no textual information sources. Further when examining the written task in the form of the student's blog entry, it is clear that the use of sources is limited to pictures. The text does not contain any references to sources except for images.

October 25

The student starts the research with the Goggle search engine, using the term "refugee obligations". The next few minutes after the class has started, the student visits a personal blog and opens 10 Facebook pages. The log file shows no activity for the next three hours, until the student logs onto It's Learning and starts on a long research session, as evidenced by 16 entries related to the topic of the film Gran Torino. The research starts with a link to a study guide about "Gran Torino" which has been published on the school blog of the teacher. This blog has been created by the teacher and contains various materials for the International English class. The study guide includes some questions that the students are to discuss before starting on their written task.

One hour following the study guide material, the log files indicate that the student has searched for a topic that is seemingly unrelated to the film. The topic of these 7 unrelated hits is a tourist destination in Spain, where a famous festival takes place. After these websites, which

are mostly picture searches, the student uses the Google search engine when searching for info using the search terms "Gran Torino analysis" and "Gran Torino symbol". The first search results in a list of hits, where a film review from www.nytimes.com is displayed on the first page of hits. Following this are three more Google searches, yielding results of which the student has selected two film reviews, from the online magazines www.filminsight.net and www.studvest.no. The websites are in English and Norwegian respectively, and the two reviews present slightly different perspectives on the films, although both of the articles discuss the effect the film has on the viewer.

Both of these reviews, in addition to the Gran Torino article on www.imdb.com and the study guide are listed at the bottom of the article the student has written on the school blog. The sources have not been referenced in the text. This could indicate that the students are not taught to reference their sources in their written work. Alternatively, the lack of references to sources in the text could also indicate that the student has used the source texts for inspiration, but has not used any quotes of facts from the sources. Moreover, at the bottom of the blog entry is a link to a website about the Hmong people, which the student urges readers to have a look at in case they are interested in the culture. In this regard, the student to some extent grants credibility to the source articles and the article about the Hmong population, and in such a way influences the digital literacy of the blog readers. Indeed, the comment field below the blog article is marked by positive comments and gratefulness to the student for having helped the commentators with insights about the film.

November 22

At the beginning of the lesson, before the term has started, the log files show that the student has done research on one specific topic, global warming. The log file contains numerous hits on this topic. In sum, there are five hits from www.nationalgeographic.com, two hits from

www.globalwarming.com, two hits from www.nytimes.com and three hits from www.regnskogfondet.no. These websites are followed by It's learning and 21 hits for Facebook pictures. Around one and a half hours later, the log files show that the student has continued the research, and there are even more hits related to the topic. Two of the hits are from www.cicero.no, regarding articles on global warming. Three hits contain articles related to vegetarianism and the environment, where two of the hits are from www.emagazine.com and one hit is from www.newscientist.com.

When looking at the websites from the research process, it appears that the student opts for information from sources of high repudiated credibility, such as NY Times, National Geographic and New Scientist. Also, several of the websites have been listed as sources in the term test essay. The sources listed in the essay are www.nytimes.com, www.nationalgeographic.com and www.regskog.no. Facts from these websites have been used in the essay; however they have not been referenced in the text. This indicates that the student might not be obligated to reference his/her sources in the essay text, or that the student has forgotten to do so.

Student C Summary

The first day of search is marked by websites that are irrelevant for the topic, in addition to several picture searches, which show that the student has searched for pictures and not textual information for the written assignment. On the second day, the student has visited several websites that are irrelevant for the topic, in addition to relevant picture searches and websites regarding the film the class is to write about. The relevant hits are from a few film websites of high credibility, namely the highly repudiated New York Times newspaper and also the International Movie Database. There is also a film review from a Norwegian student website of a certain reputation, as it is linked to educational institutions, and the

texts are written by students in higher education. In addition, the student has also linked to a website about the Hmong people. Even though the log files point in direction of a somewhat high level of information literacy, the written text does not contain any references or source list.

However, the third day of research does point to a higher level of information literacy, as the log files contain several relevant websites of high credibility. Most of the sources are of high international repudiated credibility, and www.newscientist.com is a website with peer-reviewed academic research articles. A few of these have been listed as sources in the term test essay, but, similar to all of the other blog entries and term test essays, the sources have not been referenced in the text.

6.1.4 Student D

October 18

There is no log file from this student on this date due to technical difficulties. The blog entry does not contain a source list. However, in the blog entry the student does refer to a speaker who visited the school to give a talk about social media. The student has added a link to the blog of this speaker in the introduction to her text.

October 25

The student starts the lesson by logging on to Windows Live and Facebook. The log files reveal more than 100 hits for Facebook during the lesson, and these hits are evenly distributed throughout the duration of the entire period. After the class has viewed the film, the log file shows that the student accesses the class blog where the teacher has published a study guide and tasks related to the film "Gran Torino". Shortly after this, the student visits the page for "Gran Torino" on www.imdb.com, before using www.wikipedia.com in order to find more information about

the film. These two websites might have been used as a quick reference, and one of the websites can have been used for corroborating and comparing the information from the other website. The student opens links to both the English and the Norwegian version of Wikipedia. In addition to Wikipedia, there is also an entry for www.dictionary.com, where the student has searched for the definition of the word “starred”. It appears that the student has used the dictionary in order to get help in understanding a word from the texts about the film.

The blog entry does not contain any references to any sources, and the text does not include a source list. However, the introduction to the blog entry does contain some very specific facts about the film, related to release date and number of film awards. This indicates that the student has found some facts on Wikipedia or IMDB, but has not referenced or listed these sources.

November 22

The first entry on the log file list is a Google search using the term “social media”. Furthermore, there are entries for the OneNote web app, Microsoft SkyDrive and an online notebook, which is shared by the class. This indicates that the student prepares for handling text and information in cloud storage online. Further, the log file contains 19 entries to websites with information about various aspects of English language learning. Some of these websites are www.world-english.com, www.learn-english-today.com, www.eslgold.com, www.usingenglish.com, www.phrases.org, www.alphadictionary.com and www.alphadictionary.com. The topics covered in the entries from the log files range from phrases, expressions and useful words to how to write essays in English. The log file does not contain any searches for these topics on English language learning; therefore, this might indicate that the links to these websites can be found in the online class notebook that the student accessed earlier.

Further, as part of the research for the social media topic, the student uses the search phrases "social media teenagers", "bad use of social media", "social networking", "facebook statistics" and "media cons" with the Google search engine, which yield many results. The student selects a few of these websites as indicated by the log file. During the course of one and a half hours there are 11 websites which are related to the topic of social media. The websites include www.techxav.com, www.pewresearch.org, www.mashable.com, www.whatissocialnetworking.com, www.facebook.com/press/info, www.simplyzesty.com and www.writework.com. These websites represent a varied selection of sources. Techxav, Mashable, and Simplyzesty are commercial online magazines. Pewresearch.org on the other hand is a non-partisan think tank based in Washington, which publishes information on social issues and public opinion both in the USA and internationally, in addition to carrying out major research projects. The Pew research website is a source of high repudiated and conferred credibility.

In addition to research on the social media topic, the student has also used Google in order to learn about English grammar and expressions. The log files contain Google searches with the phrases "no less than vs not less than". The student has accessed the website www.englishforum.com in order to read about the difference between the two expressions. Further, the student has used the Google search engine in order to find the proper preposition, as evidenced by the search phases "people in higher authority" and "people of higher authority". However, the student has not used quotation marks for this search, which consequently, as shown by the log files, gives many search results with only some of the words in the search phrase. It appears that the student has attempted to use the Google search engine as a form of corpora, in the hope of seeing the phrase containing the correct preposition yielding more search results. However, due to the lack of quotations marks, the search engine does not necessarily serve this purpose.

There are also a few websites containing quotes, related to the search phrase “time you enjoyed wasting is not wasted time”, a quote which the student has used in the term test essay. In the essay, the student has listed two websites in addition to the student's own school blog, which are the online magazines www.simplyzesty.com and www.mashable.com. Both of the sources listed in the essay can be found in the log file, and the essay does contain facts from the source texts. However, the sources are not referenced in the essay text, similarly to the essay texts of the other students in my study. It appears that the students are either not obligated to reference the sources they use, or they might possibly have forgotten to do so.

Student D Summary

The first day of data collection is marked by a very large number of hits for Facebook, before the research for the assignment topic is evidenced by what seems like the staple websites for film analysis writing, namely the International Movie Database and Wikipedia. These websites might indicate a rather low level of information literacy, as the information from Wikipedia with its' emergent form of credibility has not been corroborated. In addition, it appears that the student has not used the links on Wikipedia in order to do further research.

On the second and last day of data collection, student D does however search for a large number of English language learning websites, unlike the other students in this study. It appears that this student views the internet as a source of relevant info about learning certain technicalities of the English language. The student has found multiple different websites of this kind, and this does point to a certain level of information literacy. Also, when looking at the number of sources related to the social media topic, it seems that the student aims to find multiple websites with a certain level of credibility, although not of international peer-reviewed credibility, as the sources are mainly online magazines and

blogs. Lastly, it is worth noting that the student has visited a website with ready-made English essays, which in turn points to possible plagiarism.

Overall, when looking at the collected amount of data, a few tendencies become apparent regarding the research process of the students. Firstly, all of them visit many websites that are not relevant for the topic of the assignment and at the same time, all of them visit quite a few websites that are relevant for the written topic. Secondly, the majority of the written texts do not contain any source lists, regardless of how many relevant websites the students have accessed during the research period. In this regard, it is worth mentioning that one of the four students has consequently listed sources on all three assignments, and this student has visited and listed quite a few sources of high credibility. Lastly, none of the students has referenced any sources in their texts, which points to that this is perhaps not a requirement for the assessments.

While chapter 6 is largely descriptive with presentations of data, in order to convey the methodological content of my study to the reader, the next chapter contains a discussion of these data. I will be looking at my data/findings against a backdrop of the theory of mediated action, where the aim is to point to some substantial findings rather than simply examples of data. The aim of the discussion is to use my data in order to try to answer my initial research questions.

7 Discussion

As mentioned in the introduction to this thesis, the topic of information literacy is particularly linked to the English language. English competency is a prerequisite for being able to exercise online information literacy, and information sources in English are used by students in various subjects. One might suggest that the language in many regards functions as a key to the gateway of digital information. Consequently, the issue of information literacy has a necessary place in English didactics, and I will return to this point towards the end of this chapter.

As an introduction to this chapter, I return to the initial research questions in order to try to answer them by applying the theory of mediated action to my research findings. The first question centres on how students in upper secondary do research online. I have analysed the findings in light of the concepts of mastery and appropriation when answering this question. As mentioned in chapter 3, mastery is related to general digital literacy, whereas appropriation denotes a more specialized digital literacy, namely information literacy. Next, I comment on how the students make use of online English language learning resources in order to expand on their language skills and point to benefits and challenges of such online sources. The second research question centres on how the students make use of sources in their written work. When answering this question, I examine the types of assessment and look at how assessment influences information literacy in students.

When looking at the data from the log files, a few tendencies become apparent. Throughout the three sessions of research and the subsequent written tasks, the log files of the students to some degree display distinctly different habits regarding their information literacy practices. The log files of one of the students contain a higher number of

sources of high credibility compared to the others, and in addition, the student also lists more sources at the end of the completed texts. Surprisingly, Wikipedia is not to be found on more than two of the log files. On the other hand, all of the log files contain quite a few websites that are not related to the topic of the written task.

It seems that the students do not prioritize to use sources in their essays, as so many of the written texts do not contain source lists. The reason could be that the students find it challenging to implement sources in their texts, and that they feel capable of writing a good text without having to consult sources. For three of the students, personal experience and reflection sufficed as evidence both for the film review of Gran Torino and the article about social media. Perhaps source use and information literacy is not a large part of the grade for these texts, and it is not central to the assessment. Regarding the term test essay, it is likely that the students felt more committed to listing sources, as this assessment is bigger and counts more towards their term grade.

7.1.1 Mastery vs Appropriation

The students display a high level of mastery of digital skills, as they are skilled at using a search engine with the aim of finding information about a topic. Further, they make use of the Google blog platform when they publish their written texts, which, including pictures, are multimodal digital texts. The students make use of the Google search engine when using search terms that yield websites that are relevant for the written assignment topics. Also, the websites that are not relevant for the assignment topic indicate that the students are skilled internet users; they are able to quickly find websites within their field of interest, whether those are job advert websites, travel websites, newspapers or social media websites. In addition, they also make use of the Google blog platform when writing their assignments, where they structure the text

and make use of pictures in order to create a multimodal digital text. The students display a high level of mastery of digital skills, but when looking at their online research and how the sources have been utilized, it seems that the students are struggling with information literacy. The log files and the written assignments reveal a high level of mastery and a lower level of appropriation. The students are able to use their computer skills effectively, but they struggle to find, assess and make use of online sources in their written texts.

The log files of all four participants in my study show that the students do access many websites that are not related to the topic of their written assignments. This is similar to the findings in the Blikstad-Balas study, where the students did not pay attention to the plenary teaching, but rather spent time on online activities of their own choice. However, the students in my study conducted their research during a five-hour full-day English lesson, where they worked independently for parts of the lesson. There is a difference in working mode between a single-lesson of plenary teaching, as in the study by Blikstad-Balas, and the more student-oriented structure of the full-day lesson. It cannot be expected of the students that they concentrate on the same topic for five hours, and it is not surprising to see traces of vernacular activities.

Indeed, as the log files and source lists indicate, there is no connection between the number of relevant websites and irrelevant websites. The student with the largest number of websites of high credibility, student C, has spent class time on accessing numerous unrelated websites. Moreover, the online vernacular activities can be seen as evidence of mastery, as the students make use of the internet in order to access many types of information that are useful to them, and thus use the tool effectively. On the other hand, it is not known to what extent such vernacular activities might affect focus and learning.

Regarding signs of appropriation or information literacy in source use, this would be evidenced by source lists, and, to an even greater extent, references to sources in the written texts. The level of information source credibility is an important factor when looking at how log files and source lists point to a level of information literacy.

7.1.2 Levels of credibility as sign of information literacy

The types of sources related to the assignment ranged in credibility from commercial blogs and magazines to peer reviewed academic research articles. The data indicate that there are some individual differences in information literacy between the participants in this study. As mentioned earlier, one possible sign of information literacy based on the data used in this study would be to see both log files and source lists with multiple websites about the same topic, or websites containing different perspectives on the same topic. This shows that the students might have compared and corroborated information from different sources. Based on the source lists of the completed written assignments in my study, it seems that one of them, student C, has done this on all three of the assignments, whereas student D has done so on the term test essay.

In addition to these two factors, an even stronger indication of information literacy would be to see the sources referenced in the written texts, as this would make the students responsible for their source use to an even greater extent. By referencing sources in the text, the students would show their understanding and interpretation of a given source, and it would be easier for the teacher to assess to what extent the student has used the source critically and responsibly. None of the students in my study have referenced their sources, which point to a lower level of information literacy in this regard.

Regarding the online encyclopedia Wikipedia, it seems that the students have avoided this to some extent. This finding is not in

accordance with the results from the Blikstad-Balas and Hvistendahl studies, which contain both a survey about Wikipedia use and also a qualitative interview where Wikipedia is one of the conversation topics. The students in this study view Wikipedia as useful for finding information about topics, but they are under the impression that their teachers do not appreciate to find Wikipedia on the source lists of written assignments. Teachers, with their level of information literacy, perhaps view the emergent form of credibility that Wikipedia is famous for as not of a high enough quality.

It might be that the students in my study are aware of this attitude among teachers and that they have chosen to exclude Wikipedia from their research, or it might also be that the students have not viewed Wikipedia as a useful source for the topics of their assignments. Regarding the issue of Wikipedia's emergent form of credibility, it would perhaps be useful to determine if the encyclopedia can be used to enhance the information literacy of students. There is one example of this in my study, where the student had used Wikipedia as a point of departure for further research, by opening links to the list of sources at the bottom of the Wikipedia article.

7.1.3 The constraints and affordances of online English language learning resources

One of the log files contains websites with content about English language learning, particularly content related to vocabulary, in addition to websites about how to write essays. As these websites are not preceded by any search terms, it appears that the links for the websites have been published by the teacher in order to function as a reference for the students. In such a way, the teacher confers credibility onto these websites. The websites function as a digital extension of the teacher-led language learning of primary and lower secondary school, where the

teacher explains grammar followed by pupils working on tasks and exercises.

Two of the students have made use of Google Translate as a bilingual dictionary. One of these students has used the service to translate larger pieces of text as well, however, the log files reveal that the automatic translation contains language mistakes, which the student has managed to eliminate, as the mistakes cannot be found in the written assignment text. It is clear that Google Translate requires that the user has a certain level of language competency in order to be able to detect language mistakes generated by the service. However, it seems that two of the students do trust the service as a bilingual dictionary, as some of these words can be found in the written texts as well.

The students in my study range in the grade level middle to high. It would be reasonable to assume that weaker students with a lower English language competency may rely more heavily on Google Translate for translating longer text bits from Norwegian into English. This would be an instance of how the tool is sophisticated enough to compensate for lack of mastery in the agent, as mentioned in chapter 3. The act of using Google translate for writing English by simply translating Norwegian into English is a known phenomenon among the teachers who assess such texts. It is by some considered "cheating", as the students let Google Translate write English for them, thereby enabling them to hand in English work without using their English language competency. Based on my own experience as a teacher, this writing strategy is used more frequently by weaker students, and often such a writing process is revealed by quite a few peculiar language mistakes, particularly related to sentence structure and vocabulary. However, the written texts that were part of the data in my study did not contain any such traits, and as the log files also show, Google Translate was used for translating sentences only once by one of the students.

7.1.4 Information literacy and assessment

To what extent do the assignments encourage the students to display high levels of information literacy? Firstly, it is clear that the students have not referenced their sources in the texts. When comparing log files to the written texts it is clear that the students either: search for several sources that they do not make use of or do not list the sources that they have used as basis for their written work. It is reasonable to assume that the research process on some level improves information literacy, as it exposes the students to multiple different information sources. It seems that the students do read info about the topics of the written assignments, but three of them have for various reasons chosen not to include the sources in their essays. It is of course impossible to know, based on this study, why the students have chosen to exclude so many of the visited websites from their list of sources. However, it is reasonable to assume that the students have done so as it might be a sensible choice based on the effort it takes to include sources versus the impact the sources will have on the assessment of the texts. Exercising information literacy is a rather arduous process, whether you are a student in upper secondary school or at the university. In academia, information literacy is a primary goal for students, but in upper secondary school, it cannot be expected to have the same status.

On the other hand, one aim of the general studies program is to prepare the students for higher education. The participants in my study were enrolled in VG2 International English, and their teacher did urge them to use sources in their work. The students wrote three types of text, one essay about social media, one review about the film "Gran Torino" and a term test essay about a topic from the fall semester of International English. Student A, B and D wrote blog entries about social media where

they presented their own thoughts and experiences and did not rely on external sources in order to complete the text. Student C did include a source from a speaker who had visited the school and given a talk about social media. For the film review of Gran Torino, only student C listed several sources, whereas the others supported their arguments by referring to their personal experiences of the film. The students did not have to refer to sources in order to write good texts and fulfill the requirement of the assignment. Both when writing about social media, which the students are thoroughly familiar with, and the film review, personal reflection was sufficient.

Regarding the term test essay, student A and B listed their own notes and blogs as sources, whereas student C and D listed several external information sources. The term test is a high stakes test and plays a role in determining the semester grade. The students are given the topic for the test in advance and hence they are expected to prepare, and this might encourage the students to find and make use of sources. However, none of the student texts contained any references to sources in the text, which indicates that this is not a requirement. As the term test is a large test, which is similar in form to the exam, there is also a list of assessment criteria, and source use is one of them.

The findings from the term test essays indicate that the students must be encouraged to use and list sources by keeping in mind that it is important for the assessment. The students should feel that source use is an important part of the written assessment in order for them to invest their time and personal resources in implementing source information into their texts. In some regards, one might argue that source references in written texts are a primary sign of appropriation. Source references in texts are evidence of how a student has assessed and applied source information. In this regard, source referencing might be considered to be a highly useful indication of level of information literacy in a student.

In regard to the type of assessment, source use might be far down the list of priorities for the students when they write their blog entries. The goal of the first task was to present a topic that they are intimately familiar with, and the aim of the second task was to present personal reflections about a film they had just seen. None of these assignments necessitate that the students familiarize themselves with new content or that they take into account conflicting viewpoints. In order for the students to spend time on sources, the assignments should require that the students reference and list sources. For example, the students could be asked to write as objectively as possible, by presenting and referring to research data and findings in their essays. Such an essay assignment would make it impossible for students to depend solely on their own thoughts and experiences. Similarly, the students could be asked to present their own opinions on a matter and use external sources in support of their arguments in order to give their opinions more weight.

In order for the students to include sources in their written work, they need to be given assignments where they will not be able to limit themselves to presenting their personal opinions on a topic or use personal anecdotes as evidence. In order for students to be able to complete such tasks, they will need training in how to make use of and refer to sources in their texts. Moreover, source use must be an integral part of the assessment, as it is for students at university level. This would help prepare the students for higher education, which is the aim of the general studies program. The findings from my pilot study indicated that English teachers do not have sufficient time to assess source use in their student's written work, and that little class time is allocated to information literacy. One of the English teachers in my study reported that the teaching of source use was covered during a double-lesson taught by the school librarian. Moreover, the interviewees in my study reported that time constraint was a primary reason for the lack of information literacy coverage in their English lessons.

7.1.5 Contributions

I would argue that my study has both an empirical contribution and a methodological contribution to the field of English didactics. By applying the terms from theory of mediated action and the models of source credibility assessment, the study touches upon some specific didactic issues related to how students manage, or do not manage, handling source materials of great complexity. By making use of the theories of mediated action and credibility assessment, I have hopefully managed to reveal some aspects of online research that are largely hidden from teachers in the classroom.

By systematically examining the log files of EFL students in upper secondary school, my study reveals aspects of an activity that is both frequent and time-consuming. Moreover, information literacy will become increasingly more important in a digital network society, where citizens are presented with new challenges related to information credibility. As previously mentioned, young people face particular difficulties regarding information literacy due to their lack of experience and maturity. Online information research is a vital learning activity that deserves a greater place within the field of didactics. Particularly English didactics are relevant in this regard, as English language competency is a prerequisite for enhancing digital literacy and information literacy in particular. For this reason, I would go so far as to suggest that the term “information literacy” should be included in the National curriculum for English. As mentioned in earlier chapters, the National Curriculum for English does mention several aspects of information literacy, yet the specific term is not used in the document. As my pilot study indicated, information literacy is not necessarily an integrated part of English teaching in many classrooms. As this competency is becoming increasingly more important,

it is worth considering whether information literacy should be given a greater place in English language teaching and EFL teacher training.

7.1.6 Questions for further research

The findings in my qualitative project has caused me to wonder about several aspects of the constraints and affordances of online computers in Norwegian classrooms, and some of these concerns center around the issue of information literacy.

- It would be interesting to look at how information literacy is taught in English classrooms in Norway. The participants in my study did in many cases not list sources, and none of them referenced their sources in the text. My small pilot study pointed to that the teaching of source use is not prioritized during ordinary classroom teaching, but in some instances handled by the school librarian. The school librarian is an expert in information literacy, yet it would perhaps benefit students if information literacy was an integral part of, not only English teaching, but most subjects in general. Moreover, it would also be of interest to explore how information literacy is assessed by teachers and examiners.
- As a continuation of the point above, it would be relevant to look at whether the general studies program in upper secondary school sufficiently prepares students for higher education regarding source use and information literacy.
- It would also be interesting to look at how vernacular activities, where students access websites with content that is irrelevant for the assignment topic, affects learning. What kind of consequences might the loss of focus have on learning? Particularly when students do online research, they are left to navigate the internet on their own, and they are given varying amounts of time to do this. To what

extent might teachers facilitate so that students remain focused during research activities?

8 Conclusion

In this thesis, I have examined the log files of upper secondary EFL students in order to form an impression of which websites they access during research in class, and also how they make use of sources in their written work. The aim of the study was to examine aspects of information literacy among EFL students in upper secondary school. The method I have used for this project is a qualitative content analysis, where I look at the browser history files and the completed written texts of the students. The aim is to gain insight into a phenomenon on which there has been done very little prior research.

My findings suggest that the students display a high level of digital literacy, but a lower level of information literacy. This poses some questions regarding to how source use is assessed and how information literacy should be taught. Considering the importance of information literacy in today's networked world, and how several aspects of it are mentioned in the National curriculum, I suggest that information literacy be given a more prominent place in English didactics and EFL teacher training.

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